

## **COMPLICATIONS OF UROLOGIC PROCEDURES/DEVICES**

### **LITHOTRIPSY:**

- Application of repetitive high-intensity sound waves to fragment GU calculi
- Typical complications include:
  - Abdominal and flank pain, N+V (typically 48 hours post procedure)
  - Ureteral colic and fever
  - Haematuria → generally self-limited (<24 hours)
- More severe complications:
  - Perinephric and renal haematomas → especially due to subcapsular renal haemorrhage with rupture → suspect in those with SEVERE FLANK PAIN and EVIDENCE OF HAEMORRHAGE (i.e. hypotension, syncope, shock, falling haematocrit) → consult urology early as specific treatments such as embolisation and nephrectomy may be required
  - STEINSTRASSE (“street of stone”) → refers to post-lithotripsy dispersal of stone fragments, usually within the ureters → when an accumulation of these calculi or one large fragment becomes lodged, flank or groin pain with obstruction and superimposed infection may co-exist → treatment options → repeat lithotripsy, percutaneous nephrostomy, conservative management
  - CASE REPORTS OF RARE COMPLICATIONS:
    - Injury to other abdominal viscera → bowel perforation, GI mucosal erosions and haemorrhages, ureteric perforations, splenic subcapsular haemorrhage, abscess to psoas, pseudoaneurysm to SMA branch
    - Patients may present with flank or abdominal pain, signs of peritonitis and fall in haematocrit

### **VASECTOMIES:**

- Most commonly an outpatient procedure with a low failure rate and risk of side effects
- Acute post-op complications include:
  - Bleeding and scrotal haematoma
  - Local wound infections → cellulitis and abscess
  - Epididymitis
  - Painful sperm granulomas
- Patients may develop persistent testicular pain months to years later
- Management:
  - Analgesia
  - Consideration of antibiotics, especially in immunosuppressed
  - Treatment for pain → ice packs, scrotal support, pharmacotherapy with NSAIDs or opiates

### **ADULT CIRCUMCISION:**

- Usually performed in infancy
- Complications include:

- Bleeding/infection most commonly
- Pain
- Haematomas
- Swelling
- Suture tears and wound dehiscence due to premature erection before completion of healing

**PROSTATE SURGICAL PROCEDURES AND COMPLICATIONS:**

- Direct manipulation of the urinary outflow tract may result in blood clots and subsequent retention and failure to void with urethral strictures and UTI
- Overall mortality is low → only 4-5% need blood transfusion
- Patients presenting with outflow obstruction should be treated with a three-way irrigation catheter
  - Prolonged irrigation requires monitoring of serum electrolytes for hyponatraemia

**COMPLICATIONS OF URINARY CATHETERS:**

- Long-term catheterisation (i.e. >30 days) is used for patients with bladder outlet obstruction not treatable otherwise, for those severely incontinent patients who are terminally ill or cannot care for themselves or for some patients with neurogenic bladder incontinence
- COMPLICATIONS can be broken down to the following:
  - INFECTION
  - OBSTRUCTION
  - LEAKAGE
  - TRAUMATIC COMPLICATIONS DURING INSERTION

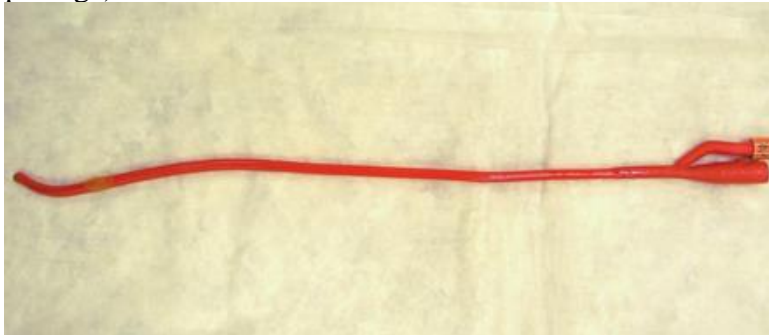
<b>Table 98-1 Complications of Urinary Catheters</b>	
<b>Indwelling Urethral Catheters</b>	<b>Suprapubic Urethral Catheter</b>
Infection	Local complications
Asymptomatic bacteriuria	Hematoma formation
UTI	Persistent leakage
Pyelonephritis	Insertion failure
Prostatitis	Infection
Epididymitis	Asymptomatic bacteriuria
Scrotal abscess	UTI
Trauma	Pyelonephritis
Hematuria	Abdominal wall cellulitis
Creation of false lumen	
Urethral disruption	
Bladder perforation	
Mechanical obstruction	
Nondeflating catheter balloon	
Intraluminal encrustation	
Blood clots	
Periurethral catheter leakage	

- INFECTION:
  - Catheter-associated UTI are one of the most common causes of nosocomial infections
  - Risk of infection ~1-2% with IDC in place <24 hours, prevalence of bacteriuria reaching almost 100% for long-term catheterisation (by 30 days)
  - Comorbidities increasing the risk of catheter-related UTI:
    - Advanced age
    - Female sex
    - BPH
    - Renal disease
    - DM
    - Debilitation
  - IDC decreases ability of the bladder to rid itself of bacteria → infection begins with formation of a biofilm → organisms become embedded within the biofilm and gain protection from the mechanical flow of urine, host defenses and antibiotics
  - UTIs from IDC are usually polymicrobial → E coli, Proteus, Pseudomonas, Morganella and Candida
  - Asymptomatic bacteriuria occurs in short term catheterisation and clears with removal of the catheter
  - Diagnosis in ED can be difficult
    - Pyuria is universal for long-term catheters and in absence of symptoms should not be used to diagnose UTI
    - PYELONEPHRITIS is the most common complication of catheter-associated UTI
      - Empiric antibiotics and removal of catheter if clinically feasible or replace IDC if it has been in for >7 days

<b>Table 98-2 Infectious Complications of Indwelling Urethral Catheters</b>	
<b>Symptomatic Urinary Tract Infection</b>	<b>Comments</b>
Fever, and/or hematuria, and/or obstruction	Fever alone cannot be used for diagnosis unless other sources of infection have been ruled out; encrustation, blood clots, or catheter dysfunction may cause obstruction.
Pyelonephritis	Syndrome, including flank pain or tenderness.
Bacteremia	Diagnosis supported by correlation between blood and urine cultures.
Sepsis syndrome	See Chapter 146, Septic Shock.
<b>Suppurative Complications</b>	
Urethritis	See Chapter 96, Male Genital Problems.
Epididymitis	See Chapter 96, Male Genital Problems.
Prostatitis	See Chapter 96, Male Genital Problems.
Abscess, scrotal, urethral	See Chapter 96, Male Genital Problems.

- OBSTRUCTION AND LEAKAGE:
  - IDC can become obstructed for many reasons

- Most commonly due to formation of intraluminal encrustations during long-term placement → often associated with urea-splitting organisms (proteus and morganela)
  - These encrustations increase the risk of infectious stones and can cause bladder trauma → leads to blood clots
  - Blockage can lead to leakage around the IDC and also to acute retention
  - Periurethral leakage can occur due to bladder spasms as well → consider oxybutynin
- **TRAUMATIC COMPLICATIONS:**
  - Adequate lubrication and proper catheter size can help to minimise the risk of trauma to the urethra
  - Urethra can be injured from inflation of the retention ballon within the urethra
  - False lumen can be created
    - IDC can kink, especially if there is stricture or BPH
  - Make sure the foreskin is repositioned after IDC insertion
  - **SUSPECT BLADDER PERFORATION IN PATIENTS WITH PERITONEAL SIGNS, PYURIA AND HAEMATURIA WITH DIMINISHED URINE OUTPUT → cystogram warranted**
  - To avoid traumatic complications → use Coude-tipped IDC (see below) and try a larger size using gentle pressure (stiffer and allows easier passage)



Insert with tip up to follow natural contour of the urethra

#### **ALTERNATIVES TO INDWELLING CATHETERS:**

- **Suprapubic catheterisation →** risks of cellulitis, haematoma formation, organ perforation and persistent leakage

#### **COMPLICATIONS OF PERCUTANEOUS NEPHROSTOMY PROCEDURES:**

- Percutaneous nephrostomy is a urinary drainage procedure used for SUPRAVESICAL OR URETERAL OBSTRUCTION DUE TO:
  - Malignancy
  - Pyonephrosis
  - GU stones
  - Ureteral structures

- Urinary diversion → in transection (trauma), vesical fistula
- In general, list of complications is low → bleeding infection, mechanical complications related to the catheter and accidental puncture of adjacent organs
  - Lungs (pneumothorax), liver spleen and bowel
- Bleeding/haemorrhage exacerbated by underlying coagulopathy → most are mild and managed with irrigation → severe bleeding handled by catheter tamponades
  - Severe bleeding results from laceration of an artery, formation of AV fistula, bleeding from a pseudoaneurysm
- Infectious complications → simple bacteriuria, pyelonephritis, renal abscess, bacteraemia, urosepsis

**COMPLICATIONS OF ARTIFICIAL URINARY SPHINCTERS:**

- A device used for urinary incontinence due to sphincter disturbance, postsurgical incontinence and neurogenic bladder
- Infections are the most serious complication with periprosthetic infection early or late → IV antibiotics and removal of the sphincter
- Mechanical complications can also occur → blockage
- Urethral erosion is a serious complications → occurs due to infection or excessive cuff pressure → pain swelling along the urethra and in the perineum

**COMPLICATIONS OF URETERAL STENTS:**

<b>Table 98-3 Complications of Ureteral Stents</b>
Fever/sepsis
Urinary tract infection/pyelonephritis
Irritative bladder symptoms
Dysuria/urgency/frequency
Hematuria
Pyuria
Flank pain/abdominal pain
Pain with voiding
Incontinence
Obstruction
Stent migration/stent fragmentation
Encrustation
Erosion of the urinary tract
Vascular-ureter fistula
Malposition
Stent malfunction

- Most commonly infection relates to UTI, but more rarely pyelonephritis and sepsis can occur
  - Minor infection do not require stent removal
  - If more severe infection → consult urology and start IV antibiotics
- Mild flank pain and irritative bladder symptoms (dysuria, urgency, frequency, incontinence) all can occur post stent insertion
- New complaints and symptoms (e.g. severe flank pain) → evaluate for stent migration, infection or obstruction
- More serious complications → stent migration or fragmentation or even ureteral-arterial fistulisation are usually late complications seen with long-term use
  - In presence of severe gross haematuria and syncope or hypotension → assume vascular fistulisation from eroding stent → transfuse as appropriate and involve urology/interventional radiology



Ureteral stent migration with distal stent coiled within the bladder

### **COMPLICATIONS OF DEVICES USED FOR ERECTILE DYSFUNCTION:**

- Most common causes of erectile dysfunction:
  - DM
  - Priapism
  - Vascular disease
  - Peyronie disease
  - Pelvic trauma
  - Surgery
  - Psychogenic

- Variety of pharmacological and non-pharmacological treatments with specific complications:
  - INTRACAVERNOSAL INJECTION:
    - Injection into lateral aspect of penis, directly into corpora cavernosa with vasodilation → uses papaverine, phentolamine and alprostadil (PGE1 analog)
    - Problems → priapism, penile pain, prolonged erections, localised haematoma
    - Treatment → alpha-adrenergic agonists (phenylephrine), corporal aspirations
  - INTRAURETHRAL INFECTION:
    - Intraurethral injections of alprostadil are successful in produces penile engorgement
    - The drug is absorbed from the urether and through local communicating vessels and exerts its actions on the corpora
    - Side effects are few → rarely priapism
  - VACUUM DEVICES AND PENILE SPLINTS:
    - Work by use of negative pressure and use of a constriction ring to cause venous and arterial congestion
    - Most common compliatn is pain
    - Serious complications → penile skin necrosis, urethral bleeding, ischaemia, subcutaneous haemorrhage. Peyronie disease and Fournier gangrene have also been reported
  - PENILE PROSTHESES:
    - Reserved for failure of pharmacologic treatment
    - Self-contained devices consists of a pair of inflatable cylinders inserted in the cavernosa and a scrotal pump
    - Post-op urinary retention, penoscrotal haematoma, superficial wound infections have all been reported
    - Infection is the most devastating complication and is usually reported soon after implantation → presents with pain along the device, erosion and purulent urethral discharge → treatment requires antibiotics and removal of the entire device by a urologist
    - Penile ischaemia and necrosis are rare but serious complications → occurs with those with predisposing factors (DM, vascular disease)

### **COMPLICATIONS OF URINARY DIVERSION AND ORTHOPTIC BLADDER DIVERSION:**

- Most common method of urinary diversion is ILEAL CONDUIT → section of small bowel is isolated and free ends of remaining small bowel are reunited and ureters are reimplanted to the isolated section of small bowel → stoma is created
- Post-operative complications include:
  - Bowel obstruction
  - Pyelonephritis
  - Skin breakdown around the stoma
  - Stenosis of the stoma

- Conduit, ureteral anastomosis dysfunction
- urolithiasis
- Complications occur in 66% of patients
- Multiple new methods for neobladder formation, but none has been shown to be superior
- Diagnosis of infection should be made on evidence of symptomatic infection based on fever, flank pain, a change in chronic symptoms or culture of pathologic organisms

### **COMPLICATIONS OF MALE GENITAL-RELATED FOREIGN BODIES:**

- THREE BROAD CATEGORIES:
  - **Genital piercings** → need to ask environment in which it was done and type of object using → can cause paraphimosis or urethral injury, as well as local and systemic reactions. Beware infection in the immunosuppressed and those with valvular heart disease. Can also have problems related to trauma → local oedema, haematoma and tissue tearing
  - **Constricting devices** → penile strangulation due to encircling object → leads to oedema and vascular compromise, eventually ulceration, necrosis and gangrene of the penis. Requires prompt removal of the device. If unable to void after removal → need to assess urethral integrity as well ischaemia
  - **Urethral foreign bodies** → can result from psychiatric conditions, intoxication, dementia or sexual experimentation. Complications include dysuria, haematuria, UTI, urinary retention and penile pain and swelling. IV antibiotics and urology referral