UTIs and Intermittent Catheterization: Treatment and Prevention

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Continuing Education Approval
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CERTIFIED REHABILITATION COUNSELORS
CASE MANAGER CERTIFICATION

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UTIs and Intermittent Catheterization: Treatment and Prevention

Objectives:
1. Describe the indications and components related to intermittent catheterization (IC) in both men and women.
2. Identify common complications seen in long term IC.
3. Classify catheter associated urinary tract infections seen in the IC population.
4. Distinguish treatment options for IC associated urinary tract infections.
5. Detail ways to prevent UTIs.
6. List the different types of catheters available for use with self-IC.
7. Identify current principles and techniques used in teaching self-IC.

Intermittent Catheterization (IC)

Definition:
• Insertion of a catheter into the bladder to allow for urine drainage
• Removed after drainage

Advantages:
• Minimizes episodes of overdistention of bladder
• Regular bladder emptying
  • Reduces intravesical pressure
  • Improves blood circulation in the bladder wall making the bladder mucous membrane more resistant to infectious bacteria

Intermittent Catheterization (IC)

Safest bladder management to prevent upper and lower urinary tract complications including:
  • Hydronephrosis
  • Renal calculi
  • Bladder calculi
  • Vesicoureteral reflux
Conditions requiring IC

**Urinary Retention**
- Bladder origin
  - Detrusor hyper-reflexia
  - Areflexia bladder outlet or sphincter
- Failure to store
  - Areflexic bladder
- Failure to empty
  - Inability for the sphincter to relax
  - Detrusor-sphincter-dyssynergia – impaired coordination between contraction and sphincter relaxation
- Urinary Diversion – formation of a catheterizable abdominal stoma which leads to a tunnel into the augmented bladder. Indicated if:
  - Patient is unable to perform IC due to lack of dexterity or being wheelchair-bound.
  - Unable to access urethra – e.g. obesity, stricture or fistula

**Common Diseases causing incomplete bladder emptying & requiring IC**
- Spinal Cord Injury – IC preferred method in these patients
- Neurologic Diseases
  - Diabetes
  - Multiple sclerosis - certain cases to decrease symptoms of incontinence and urinary frequency and urgency in the absence of elevated PVRs
  - Spinal bifida – children
  - Parkinson’s disease
- Voiding Dysfunction – children
- Hypotonic bladder
- Urethral Obstruction due to –
  - BPH
  - Pelvic Organ Prolapse
  - Prostate cancer treatment – seeds
  - Urethral stricture
  - Severe constipation/fecal impaction

**Obstructive Conditions**

- Enlarged prostate obstructing urethra
- Vaginal prolapse obstructing urethra

**Types of IC**

- Clean intermittent catheterization (CIC) versus sterile (SIC)
  - No advantage in terms of infection for sterile IC versus clean IC
  - New policy for single-use catheters
  - Sterile technique in a child if the parent is performing the catheterization
  - Setting is a consideration – use sterile IC in
    - Acute care hospitals
    - Rehabilitation centers
    - Skilled nursing facilities

**New Policy for Single-Use Catheters**

- VA Information Letter 12-07
  - Urinary catheters are considered single-use devices by FDA
  - Manufacturers identify them as single-use
  - No policy interpretation that would allow the reuse of urinary catheters.
  - VA clinicians should follow manufacturers instructions for catheter use.
  - Catheters identified as single-use devices should not be re-used in any setting.
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Medicare Coverage for self-IC

- For each episode of covered catheterization, Medicare will cover:
  - One catheter (A4351, A4352) and an individual packet of lubricant (A4332); or
  - One sterile intermittent catheter kit (A4353) if additional coverage criteria are met.

Medical Necessity for Sterile Catheter

- Patient resides in a nursing facility,
- Patient is immunosuppressed, for example (not all-inclusive):
  - On a regimen of immunosuppressive drugs post-transplant, on cancer chemotherapy, has AIDS, has a drug-induced state such as chronic oral corticosteroid use
  - Patient has radiologically documented vesico-ureteral reflux while on a program of IC,
  - Patient is a spinal cord injured female with neurogenic bladder who is pregnant (for duration of pregnancy only),
  - Patient has had distinct, recurrent UTIs, while on a program of sterile IC with A4351/A4352 and sterile lubricant A4332, twice within the 12-month prior to the initiation of sterile intermittent catheter kits.

IC Complications

- Infection
  - Bacteriuria
  - Urinary tract infections
  - Chronic pyelonephritis - rare
- Urethral Damage (men)
  - Urethritis
  - Urethral stricture
  - Creation of a false passage
  - Epididymitis
- Pain
- Hematuria
- Bladder stones

IC Complications (cont)

- Urinary tract infections - 20%
  - Most common cause of sepsis & mortality in spinal cord injury patients
  - Prevalent with higher urine volumes at time of catheterization
- Upper tract damage - chronic pyelonephritis
  - Most common cause of mortality
  - Rare

Bacteriuria

Usually Asymptomatic

- Chronic long-term - seen in 50% of CIC clients (70% of children)
  - May be introduced at time of catheterization
  - Rarely leads to UTIs - not treated with antibiotics
- Pathogenesis
  - Host (patient) develops resistance to organisms
- Treatment
  - No routine cultures
  - No prophylactic antibiotic

Causes for Development of UTI

- Chronic, long-term catheterization
- Poor knowledge of the urinary system – TEACH YOUR PATIENTS
- Poor catheterization techniques
- Formation of biofilms - collection of microorganisms and their extracellular products that bind to a solid surface which thickens as the micro-organisms multiply
**IC Complications**

**Risk Factors for UTI**

- Gender – more common in women
- Existence of a cervical injury
- Co-morbid conditions
- Frequency of catheterization (<3x/day more at risk)
- Mean cath volume > 400 ml - more susceptible causing overdistension of bladder
- Urinary tract conditions (e.g. stones)
- Previous history of UTI

**Recurrent UTIs?**

- Change type of catheter
  - Catheters with “introducer tip” which bypasses the colonized 1.5 cm of the distal urethra may decrease incidence of UTI

**How to determine UTIs**

- Urine dipstick and microscopic examination were equally valuable for bacteriuria in SCL
- Combining Culture and UA best
- Common pathogens
  - Women
    - E-coli
  - Men
    - Gram + cocci
    - Staph
    - Enterococci

**Medicare’s Definition of UTI**

- Urine culture with >10,000 colony forming units of a urinary pathogen AND
- Concurrent presence of one or more of the following signs, symptoms or laboratory findings:
  - Fever (oral temperature greater than 38°C [100.4°F])
  - Systemic leukocytosis
  - Change in urinary urgency, frequency, or incontinence
  - Appearance of new or increase in autonomic dysreflexia (sweating, bradycardia, blood pressure elevation)
  - Physical signs of prostatitis, epididymitis, orchitis
  - Increased muscle spasms
  - Pyuria (greater than 5 white blood cells [WBCs] per high-powered field)

**Treatment**

**Antibiotic therapy**

- Only treat if documented UTI not bacteriuria
- Single agent therapy is recommended
- Long-term antibiotic prophylaxis is undesirable because it is associated with the emergence of resistant bacterial strains
- Common antibiotics used:
  - First-line
    - Cotrimoxazole & Trimethoprim (Bactrim, Septra)
    - Nitrofurantoin (Macrobid)
  - Second-line
    - Broads-spectrum fluoroquinolones (Cipro, Levaquin, Floxin)
- Treat at least for 5 days, 7 to 14 days if it is a re-infection

**Infection Prevention**

**Antibiotic suppression – not effective**

- Unwanted shift in bacterial flora – increase in antibiotic resistance
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**Infection Prevention**

**Oral antiseptics**

- Anti-infective agents
- Methanamine hippurate – Hipprex 1 to 2 Gms combined with Vitamin C (ascorbic acid) 1 to 2 Gms/day
- Support acidic environment

**Infection Prevention**

- Use of Cranberry products
  - Evidence not conclusive – most studies used juice
  - Cranberry juice (300 mls/day) prophylaxis was found to decrease chronic bacteriuria in elderly women
  - Cranberry tablets (300-400mg twice daily) may have same benefit without calories
  - CONTROVERSIAL - Theory –
    - Urine acidification as a result of increased hippuric acid excretion
    - Inhibition of Gram-negative and Gram positive bacteria adherence to uroepithelial cells (esp E coli)
      - Water does not reduce this adhesion
    - Washout of bladder bacteria caused by increased fluid volume,

**Infection Prevention**

- Evaluate Catheterization technique
  - Compliance with prescribed treatment
  - Assess perineal hygiene
  - Ensure manual dexterity – ability to perform other self-care e.g. dressing, transfers
  - Evaluate catheter cleaning technique
  - Determine if need to switch to sterile – one-time use catheter or system
  - Medical necessity - 2 documented infections (+ urine cultures) in past 12 months
  - Change type (material) of catheter to prevent trauma

**IC Complications (cont)**

**Urethral Complications**

- Urethral Damage (men)
  - Similar to the problems seen with indwelling catheterization
- Urethritis
  - Frequency of insertion
  - Forceful catheterization against a closed sphincter

**IC Complications (cont)**

**Urethral Complications**

- Urethral stricture
  - Inflammatory response to repeated catheterization
  - Risk increases with the number of years in IC
  - Use of hydrophilic catheters may decrease the incidence
- Creation of a false passage
  - Occur primarily in men with persisting urethral strictures
  - Secondary to urethral trauma at the site of the external sphincter
- Epididymitis/scrotal abscess
  - Due to urethral and bladder inflammation men
- Bladder stones
  - Occur in long term patients
  - Grow around introduced pubic hairs
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**IC Complications (cont)**

- **Prostatitis** – especially in aging men
- **Pain/Soreness/Discomfort**
  - In men with urethral sensation particularly as when they remove the catheter can experience some pain (a “clamping down” feeling) secondary to urethral spasms
- **Bleeding/Hematuria**
  - Common with initial catheterizations
  - Occasional blood is normal
  - Persistent bleeding may indicate UTI or some other problem

**Catheter Types**

- **Design**
  - 2 eyes at the tip that allow for urine drainage.
  - Sized according to French (FR) scale [range is 6 to 18 FR]
  - Each unit equals 0.33 mm
  - End may be color-coded to identify FR easily
- **Gender Differences**
  - **Women**
    - Length 20 to 23 cm or 5 or 7 inches allow more efficient drainage by reducing the risk of looping or kinking
    - Reduce risk of upward gradient drainage of the tube
  - **Men**
    - Length - 38 to 41 cm or 12 inches

**Types of Catheters**

- **Straight catheters**
- **Coude or curved catheter**
- **Prelubricated hydrophilic**
- **Self-contained systems**
- **Coated catheters**

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**Prelubricated hydrophillic**

- Coated with a substance that absorbs water and binds it to the catheter surface
- Extremely slippery smooth layer of water stays during insertion and withdrawal
- Easier insertion, minimize discomfort, protects urethra from damage and irritation
- Surface dries after 5 minutes becomes “sticky,” unsure affect
- One-time use only
### Intermittent Catheterization

- **The advantage of hydrophilic catheters**
  - multiple studies confirm less trauma
  - decreased incidence of hematuria
  - decreased incidence of UTI
  - patient preference
  - easier to use
  - stabilize urethral stricture disease
  - plastic stiffer than rubber

Source/Permission - Coloplast


### Coated Catheters

- Have a coating of antibacterial agent (e.g. nitrofurazone) on the outer layer of the catheter is felt to produce local antibacterial activity
  - Some research in indwelling catheters
  - Felt that systemic absorption does not occur
  - Clinical uses:
    - Tx of bacterial nonspecific urethritis
    - Prophylaxis of infection before and after instrumentation of the urethra

### Self-contained systems

- **“No-touch”**
  - Closed systems that provide sterile catheterization
  - 100 % latex-free
  - Pre-lubricated catheter
  - Passes through special guide mechanism at the top of the pocket
    - Keeps catheter straight as it is advanced
    - When squeezed, prevents catheter from slipping during insertion

Source/Permission - Coloplast

### Consideration for Teaching ISC

- **Adult Educators**
  - Increase success by assessing patient’s:
    - Baseline knowledge
    - Learning ability

- **Adults Learners**
  - Learn best under low to moderate stress
  - Retention is directly affected by the degree of their original learning.

### Teaching ISC

- Assessing and teaching ISC in a low stress setting is best accomplished prior to the procedure.
- A “refresher” after the procedure will be more successful if there is prior knowledge to draw on

### Teaching ISC

- Assess the patient’s ability to learn:
  - Ability to learn task effectively
  - Motivation to continue with a procedure that could continue for a considerable period of time
  - Awareness of problems associated with CISC
  - Understanding of how to avoid associated problems such as UTI
Consideration for Teaching ISC

- Initially, may have reservations because of fear of inability to perform
- Age is not a deterrent
- Obesity may be a deterrent
- Poor eyesight
- Decreased perineal sensation
- Leg spasms/decreased flexibility or balance
- Decreased finger/hand dexterity, intentional tremors
- Children – exhibit frustration, anger, non-compliance
  – may need close parental supervision

Teaching ISC

- If patient is unable to learn ISC, help them to identify someone who can.
- That person will need to be available possibly several times a day, potentially for an extended period of time

Teaching ISC

- Pay attention to patient's personal hygiene
  - Hand washing
  - Cleaning of the genitalia
  - Handling of the catheter prior to insertion
- Importance of good hygiene should be stressed to help patients to help avoid UTIs
- Teach S&S of UTI, both common and uncommon

Catheter Size

- Rule of rule of thumb
  - Use catheter with smallest diameter possible that allows for adequate urine drainage
    - Infants (4 – 5 FR)
    - Toddlers & Preschoolers (6-10FR)
    - School age (8-12 FR)
    - Adolescents (12-14FR)
    - Adults (14-18FR)

Techniques

Lubrication
- Liberal use of water soluble lubricate along entire length of catheter
- Men
  - Depending on discomfort may use lidocaine jelly
  - If having difficulty passing the catheter beyond the prostate (meets some resistance) have man relax and take a deep breath

Catheterization Techniques

- Women – “Cath by touch”
- Men – hold penis in an upright position during catheter insertion to straighten the S-shape of the male urethra
- Insert catheter until urine begins to drain
Catheterization Positions

- Experiment to identify best position
- Toilet-bathroom preferred as this is the socially acceptable place for urination.
- Sitting upright gives better drainage and maximizes the chances of using the correct method to withdraw catheter which is downwards.

Catheterization Positions

Women –
- Lying on a bed in a semi-sitting position with good lightening
- Sitting on the toilet and lean back
- Squatting or standing over the toilet
- Standing with one leg on the toilet or bath

Men –
- Sitting on toilet
- Standing in front of toilet or sink

Techniques- Available aids

- One-on-one teaching using pictures
- Videos
- Mirrors cumbersome for women – use “touch” in women
- Initially women may use an aide for identification of the meatus
- Leg spreader with mirror attachment
- Children – instructional models, dolls, coloring books

Catheterization Frequency

- Based on the urine volume - general rule should not exceed 400 mLs
- Usual - 4 to 6 times/day
- Before going to sleep
- Upon awakening (probably is largest urine volume)

Catheter Care if Reusing Catheters

- Use meticulous attention to hand washing before and after catheterization
- Immediately after use, catheters should be rinsed under running lukewarm tap water for at least 30 seconds
- Soap can be used.
- Should be dried and stored in a clean, ventilated container allowing them to dry
- Store in plastic zipper bag or other clean container.

Treatment

- Cost factors
  - Consider antibiotic therapy costs versus catheterization kits costs
  - Medicare will cover up to 200 catheters/month plus 2 tubes of lubricant (single-use)
  - Medicare rates for catheters:
    - Straight $1.70/cath
    - Red rubber - $1.74/cath
    - Hydrophilic – sterile “under kits” - $6.99/cath
    - Olive tip - $6.42/cath
    - Coude tip – 6.42/cath
    - Self-contained systems - $6.99/cath
    - Blue line guide strip is free
Thank you for your attention

Special thanks to Coloplast for support of this program and for use of the product pictures.