**URINARY BLADDER CATHETERIZATION**

Urinary bladder catheterization involves inserting a catheter through urethra into the bladder. I tis a sterile procedure.

There are **two types** of urinary catheterization:

1. **single catheterization** when the catheter is inserted to remove the urine sample for testing or content of the urinary bladder to relieve the retention and removed after the procedure is finished.
2. **long term catheterization** when the catheter is left in the bladder for longer time

The patient can feel some discomfort during the procedure, but the pain should be eliminated. It is important to protect the patient privacy during the procedure with closed doors and drapes around the patient’s bed.

Indications for the procedure are listed below. In case of severe stenosis, trauma and acute infection of the urethra the procedure is contraindicated.

In Czech Republic nurses are allowed to catheterize only female patients unless they have specialized training to catheterize a male patient. The male catheterization is performed by physicians.

**TYPES OF CATHETERIZATION**

1. **Straight catheterization** – with the catheter being inserted and removed immediately after the procedure.
2. **Intermittent catheterization** – repeated catheterization of the bladder in order to empty the bladder.

CIC is clean intermittent catheterization

CISC clean intermittent self-catheterization. (Performed by the patient.)

When i tis performed at home it is often called clean catheterization, when it is not strictly sterile. Patients can catheterize themselves (clean self-catheterization) independently or with the assistance by other person.

I tis often performed by or to patients with multiple sclerosis, spinal cord lesions or female patients after some gynecological surgeries, while they still have post voiding residuum.

1. **Long term catheterization** – an indwelling Folley catheter is left in the bladder for a longer time. Either 14 days (short term) or longer (long term).

**URINARY CATHETERS**

Urinary catheters are tubes with drainage openings at the tip of the catheter. The material used includes PVC (Fig. 1), latex, and silicon.

Catheters are single lumen (straight catheterization), double lumen (indwelling catheter) or triple lumen (allows for lavage of the urinary bladder). (Fig. 2)

Straight catheters can also be prelubricated. The package can also come with urine collection bag. (Fig. 3 and 4)

**Types of catheters by the shape:**

* Nelaton catheter – plain straight catheter
* Tiemann catheter – curved at the tip (for male catheterization) (Fig. 5)
* Mercier catheter – straight catheter with bulb tip

The size of catheter is calculated in FR (French scale or gauge), also called Ch (Charriere scale). It was invented by a 19-century French person called Joseph Frederic Benoit Charriere. The sizes range from 6 to 30. The criteria for the chosen size are the gender, age, the size of urethra, and appearance of blood clots (in this case the catheter should be larger to prevent obstruction). The length of the male catheter and indwelling catheters is approximately 33-40 cm, straight-single female catheter is 20 cm long. In female patient catheters size 14 – 22 are most commonly used, in male patients 12 – 20. Some catheters have X-ray visible line. (Fig. 7 and 8)

**URINARY COLLECTION BAGS**

An indwelling catheter is connected to a collection bag.

Types of collection bags:

* Short term simple bag without emptying spout (Fig. 9)
* Short term bags with emptying spout and with/without anti-reflux valve (Fig. 10)
* Long term bags with emptying spout and with/without anti-reflux valve
* Reservoirs for hourly diuresis measurement
* Small volume bags/leg bags for ambulating patients

**INDICATIONS**

|  |  |  |
| --- | --- | --- |
| **Single catheterization** | **Intermittent catheterization** | **Long term catheterization** |
| Urine retention, the patient is not able to empty the bladder  | Urine elimination impairment  | Correct measurement of the output of urine  |
| Sterile specimen collection | Post voiding residuum  | Prevention of urine retention |
| Assessment of residual urine | „Lazy“ bladder | Monitoring intraabdominal pressure and core temperature |
| Administration of contrast dye | Neurological impairments | Perioperative care  |
| Administration of medications inti the bladder | Emptying illeal conduit (artificially made urinary bladder after cystectomy) | Bladder lavage with  [curative](https://cs.wikipedia.org/wiki/L%C3%A9%C4%8Dba) or [diagnostic](https://cs.wikipedia.org/wiki/Diagnostika) purpose |
| Emptying the bladder before examination or labor |  | Comatose state |
|  |  | Immobile patient (with cautiousness due to the high risk of infection) |
|  |  | Skin lesions (such as decubitus ulcer) in sacral area combined with incontinence |
|  |  | Obstruction of the urethra |
|  |  | Incontinence difficult to manage |
|  |  | Comfort care in terminal stage |

**EQUIPMENT**

|  |  |  |
| --- | --- | --- |
| **Single catheterization** | **Intermittent catheterization** | **Long term catheterization** |
| Single use catheter, can be pre-lubricated. Nelaton or Tiemann (for male). | Single use pre-lubricated catheter or pre-lubricated catheter with collection bag.  | Indwelling catheter - Folley |
| Lubrication gel (Instilla gel) |  | Lubrication gel (Instilla gel) (Fig. 11) |
| Hand disinfection | Hand disinfection | Hand disinfection |
| Disinfection for mucosa | Disinfection for mucosa | Disinfection for mucosa |
| Sterile gauze swabs | Clean gauze swabs | Sterile gauze swabs |
| Sterile gauze square | Mirror | Sterile gauze square |
| Sterile gloves, sterile instruments (tweezers or forceps) | Bedpan or another container to catch urine | Sterile gloves, sterile instruments (tweezers or forceps) |
| Bed protective sheet or drape |  | Bed protective sheet or drape |
| Emesis basin |  | Emesis basin |
| Urine test tubes /contrast dye |  | Collection bag, holder (Fig. 12) |
| Bedpan |  | Sterile syringe with aqua pro injectione to fill the retention balloon |
| Face mask |  | Urine test tubes (Fig. 13) |
| Sterile catheterization kit is also possible to use (Fig. 14) |  | Perforated sterile drape, face mask |

**SINGLE CATHETERIZATON**

|  |  |
| --- | --- |
| **FEMALE** | **MALE (with assistance)** |
| Disinfect hands | Disinfect hand |
| Prepare equipment  | Pull back foreskin, wash with soap and water if needed |
| Aseptically open package with gauze swabs and saturate them with disinfection | Prepare equipment |
| Open the outer cover of the catheter – remove the catheter slightly so it hangs out in the air | Position the patient on his back with straight legs |
| Open Instilla gel (not necessary with pre-lubricated catheters) | Using sterile perforated drape as indicated  |
| Open outer package of sterile gloves and prepare test tubes if applicable | The physician puts on face mask and sterile gloves. Uses non-dominant hand to hold the penis upward and pulls back the foreskin (this step is omitted in circumcised men) |
| Place disposable drape under the patient and prepare urine collection container | The nurse will give the doctor sterile instrument and sterile swab saturated with disinfectant |
| Ask the patient to bend the knees and spread legs | The physician can decide to work only with sterile gloved hand |
| Put on face mask and sterile gloves | The physician disinfects glans penis, foreskin space and urethral opening |
| Use non-dominant hand to open small and large labia and expose the urethral meatus | Used swabs are placed into emesis basin  |
| Use dominant hand to remove the sterile swabs saturated with disinfectant and disinfect genital using downward movement | The doctor inserts the sterile instrument back into the sterile package and takes syringe with Instilla gel from the nurse, instill the gel into the urethra. Gives away the empty syringe, takes again the instrument and continues with the procedure.  |
| Swabs 1 and 2 – both sides of genitalSwabs 4 and 4 – urethral meatusSwab 5 – vaginal opening | In the next step the nurse opens the package with the catheter so the doctor can grab the catheter into the sterile instrument. It is up to the physician whether he/she will use instrument or just sterile gloved hands. Both is possible. |
| Take syringe with Instilla gel, remove the cap and instill gel into the urethra. (Not necessary when using pre-lubricated catheter) | The doctor positions the Tiemann catheter with the curved tip pointing upwards and inserts the catheter into urethra. |
| Grab the catheter approximately 7cm from the tip | The catheter should be inserted 10 – 15 cm until the urine starts flowing.  |
| Ask the patient to relax and insert the catheter into the urethra, the urine should start flowing when the catheter is in place | Narrowing of the urethra due to prostate enlargement can cause difficulty in inserting the catheter. |
| In case of urine sample collection catch the urine into the prepared test tube | In case of urine sample collection catch the urine into the prepared test tube |
| When the urine stops running place the gauze square on the urethral opening and remove the catheter  | When the urine stops running place the gauze square on the urethral opening and remove the catheter |
| Dispose of the equipment, help the patient with cleaning, remove gloves and help her into comfortable position | Dispose of the equipment, help the patient with cleaning, remove gloves and help him into comfortable position |

**INSERTING INDWELLING CATHETER**

Follow the procedure of the single catheterization. The differences related to the specifics of the catheters and fixation are mentioned in the table below.

|  |
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| Prepare the equipment:* Indwelling catheter has two covers. Open the outer cover and remove the end of the inner cover at the perforated site at the distal end of the catheter
* Fill a sterile syringe with sterile aqua pro injectione (the amount is written on the balloon site of the catheter as well as on the package) and place the syringe back into its half open cover
* Prepare collection bag and holder to the bedside
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| The catheter:* Remove from the cover without contamination
* The catheter is made from soft material, grab it into sterile instrument approximately 7 cm from the proximal end
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| Insertion:* Insert the catheter. When the urine starts flowing, connect the collection bag. In case of specimen collection catch the urine first into the test tube and then connect the bag.
* Remove the syringe with aqua from the package and instill the aqua into the retention balloon.
* Pull slightly on the catheter to make sure it is safely secured in the bladder.
* Hang the collection bag below the level of the bladder on a non-movable part of the bed.
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| * Mark the date of insertion on the collection bag
* If applicable, the collection bag can be removed during patient transfer and the catheter closed by sterile button.(Fig. 15)
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**POSSIBLE COMPLICATIONS**

* Urinary tract infection related to bladder catheterization
* Epididimitis
* Obstruction of the catheter
* Injury of the urethra
* Pain related to mechanical irritation

Sources:

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