Catheterizations in Urology

Urethral catheterization

- **Indications:**
  - Chronic or acute urinary retention.
  - Monitoring of diuresis.
  - Bladder drainage and washing.
  - Urethroplasty tutoring.
  - Measurement of postvoid residual urine.

- **Necessary materials:**
  - Sterile cloth and gloves.
  - Urinary catheter: in men, a 16 Ch latex Foley catheter is usually used; in women, a thickness of 14 Ch is usually sufficient. In patients expected to undergo prolonged catheterization (>3 weeks), a silicone catheter should be used.
  - Diuresis bag.
  - Urological lubricant.
  - 10 mL syringe and distilled water.

- **Procedure:**
  - Antibiotic prophylaxis with *Tobramycin* or *Ceftriaxone*.

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<tbody>
<tr>
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<td>200 mg im</td>
<td>Single dose 30 min before catheterization</td>
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<td>Ceftriaxone</td>
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- Patient in supine position with the urologist to the right of the patient.
- Washing (soap and water) of the vulva/glans followed by application of iodine solution.
- Preparation of materials on a sterile cloth.
- Gentle introduction of lubricant into the urethra.
- Traction is exerted on the penis to keep it perpendicular to the patient and the catheter is introduced and pushed (without forcing) to the bladder until urine is observed. In case of doubt, the position of the catheter is checked through manual washing with NSS.
- Once inside the bladder, the catheter balloon is filled with distilled water.

- **Special situations:**
  - *Phimosis:* identification of the meatus may be difficult or impossible. Possible aids:
    - Opening the preputial orifice with a dissecting forceps to keep it open.
    - Holding the penis with the index finger and thumb of the left hand on the area of the frenulum in order to feel the urethra below. The catheter is then guided between these two fingers.
    - As a last resort, a dorsal incision may be made in the foreskin.
  - *Difficulty in passing the pendulous urethra:* probably due to stenosis. Placement of a suprapubic catheter is useful in this situation since insertion and dilation of a catheter may increase spongiformosis and the length of the stricture.
  - *Difficulty in passing the external sphincter:* mostly in younger patients. The patient should be instructed to relax with deep breaths. The *Valsalva* maneuver can be used or the patient can be asked to cough, which will facilitate sphincter opening.
  - *Difficulty in passing at the level of the prostate:* in prominent or obstructive prostates. Can be solved by using a slightly thicker silicone tube to better transmit the pressure to the tip of the catheter. A catheter with an angled tip may also be used.
  - *False track (urethral bleeding) or high bladder neck:* several maneuvers may be tried.
    - The use of a rigid catheter with an angled tip.
    - The introduction of a finger into the rectum to lift the prostate and reduce the urethral angle.
    - The use of a rigid thin bougie inside the catheter (not for false tracks) used with extreme delicacy and caution.
**Suprapubic catheterization**

- **Indications:**
  - The same as above, when urethral catheterization is impossible.
  - Suscicion of urethral lesion.
  - Patients requiring permanent or long-term catheterization.

- **Contraindications:**
  - *Bladder tumors:* this procedure should be avoided in patients with hematuria, as it may be secondary to a tumor.
  - *Previous abdominal surgery* (relative contraindication).
  - *Pelvic fracture* (relative contraindication). The catheter could penetrate a pelvic hematoma.
  - *Thrombocytopenia or coagulation disorders.*

- **Necessary materials:**
  - Sterile cloth and gloves.
  - Suprapubic catheterization kit with a 12-14 Ch silicon Foley catheter. A larger gauge catheter is used in prolonged catheterizations.
  - Diuresis bag.
  - Vial of *Mepivacaine* (SCANDINIBSA® 2% or similar.
  - 10 mL syringe and im needle to administer anesthesia.
  - 20-25 G spinal tap needle.
  - 10 mL syringe to inflate balloon and distilled water.
  - Ultrasound.

- **Procedure:**
  - Antibiotic prophylaxis with *Tobramycin* or *Ceftriaxone*.

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- Patient in supine position with small degree of *Trendelenburg*, if possible.
- Shaving of the suprapubic area.
- Washing of the suprapubic area and application of iodine solution.
- Placement of sterile cloth and preparation of material on it.
- Preparation of the catheter, introducing it up to, but not exceeding, the trocar end.
- With the aid of the spinal tap needle, a subcutaneous bump of *Mepivacaine* is made in the midline, two fingers above the pubis. The needle is introduced while aspirating and infiltrating anesthesia in all planes until urine is aspirated. Ultrasound is used to ensure the correct direction of the needle at all times.
- If the bladder is not totally full, this is a good time to fill it with NSS.
- A small 0.5 cm incision is made on the skin with a scalpel.
- The *trocar* is used to make an ultrasound-guided puncture perpendicular to the patient. Proceed slowly in order to control the depth of the puncture. If the puncture deviates in a cranial direction, it can enter the peritoneum; if it deviates caudally, it can get lost in the *Retzius* space.
- Upon passing through the bladder wall, an immediate escape of urine is observed. The catheter should be introduced at this moment. The *trocar* is then removed, being careful not to dislodge the catheter.
- Once the *trocar* is outside, it is split down the midline, leaving the catheter free.
- The retention balloon is filled with 10 mL of distilled water.

- **Special situations:** in patients with a history of previous abdominal surgery or pelvic fracture hematoma, an ultrasound must first be performed to assess the accessibility of the bladder and the risk of injuring an intestinal loop. If there is a risk or if the bladder is inaccessible, an open cystostomy is indicated.
Ureteral catheterization

- **Indications:**
  - Diversion of the UUT to bypass a ureteral obstruction.
  - Passive ureteral dilatation prior to ureteroscopy.
  - Ureteral anastomosis, ureterorrhaphy, or ureteral lesions tutoring.

- **Necessary materials:**
  - Fluoroscope.
  - Ureteral catheter (with or without double J end, open or closed).
  - 0.035 mm Amplatz guide wire.
  - Cystoscope with working channel.
  - Urinary catheter and urological lubricant.

- **Procedure (open catheter):**
  - Antibiotic prophylaxis with *Tobramycin* or *Ceftriaxone*.

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- In the OR under anesthesia, with the patient in lithotomy position.
- Placement of the guide wire into the working channel of the cystoscope and introduction in the ureteral meatus, ascending with radioscopic control to the renal pelvis.
- Introduction and pushing of the catheter up over the guide (if it is a double J catheter, this is done with a push catheter), making sure not to introduce it into the ureter in its entirety. Once the catheter is in place, the guide is removed. Check to make sure the distal end is in the bladder.
- If the catheter is introduced too deeply, it can be repositioned with a foreign body forceps.
- Placement of a urethral catheter.

Percutaneous nephrostomy

- **Indications:**
  - Diversion of the obstructed UUT if catheterization is (or is foreseen to be) impossible.
  - Diversion of the UUT in cases of urinary fistulas.

- **Contraindications:**
  - Upper urothelial tumor.

- **Necessary materials.**
  - Fluoroscope.
  - Ultrasound equipped with a needle guide attached to the transducer.
  - Nephrostomy kit with pig-tail catheter, Amplatz guide wire, and dilators.
  - Endovenous contrast medium.

- **Procedure:**
  - Antibiotic prophylaxis with *Tobramycin* or *Ceftriaxone* (see above).
  - In the OR under local anesthesia with patient in supine, prone, or lateral decubitus position.
  - Location of the UUT with ultrasound. Ultrasound-guided puncture with 18-22 G *Chiba* needle, seeking the lower hind calyx. Upon removing the needle from the sheath, an escape of urine should be seen. In cases of urinary sepsis, a culture sample is taken.
  - Opacification of the UUT with endovenous contrast medium.
  - Introduction of the *Amplatz* guide wire into the *Chiba* needle. Radioscopic monitoring and removal of the needle, being careful not to remove the guide wire.
  - Skin incision and dilation of the tract with progressive *Amplatz* dilators.
  - Introduction of the pig-tail catheter, monitoring its placement with fluoroscopy.
  - Securing the catheter to the skin with 2/0 silk if self-latching systems are not used.