The Title of Chapter: Urethral or urinary catheterization

1. The goal of this chapter: ................................................................. 2
2. Elements/Terms/Definitions ............................................................. 2
3. Urethral catheterization .................................................................... 2
4. Self assessment questions / answers Question/Answer ......................... 9
5. Cases in connection with urethra catheterization................................. 10
6. Reference/Suggested readings ............................................................ 11
7. Requirements – Urethral catheterization .......................................... 11
8. Knowledge tests .................................................................................. 12
9. Reference .......................................................................................... 14
1. **The goal of this chapter:**

Urethral catheterization is an important part of an everyday clinical practice. In this chapter it will be summarized the anatomical basics, and indication /contraindications and techniques of urethral catheterization of male and female patients. The complications and follow up are reviewed. Furthermore the basic principles and general rules will be discussed.

2. **Elements/Terms/Definitions**

*The urinary bladder:* the urinary bladder is the organ (muscular sac in the pelvis) that collects urine excreted by the kidneys before disposal by urination. Urine enters the bladder via the urethras and exits via the urethra.

![](image)

*Figure 20-1. The Foley catheter*

*The Foley catheter:* consists of a double-lumen rubber tube with a large drainage channel and a smaller lumen for inflation of a balloon near the tip. This balloon holds the catheter within the bladder and prevents leakage of urine. (*Figure 20-1.*) There are catheters have a third lumen for bladder irrigation. (*Figure 20-2.*)

*Figure 20-2.* There are catheters with three lumen, the third lumen use for bladder irrigation.

3. **Urethral catheterization**

Insertion of a Foley catheter for urinary drainage is a commonly performed bedside procedure. In this chapter the method of insertion of Foley catheter will be discussed.
Indications of urethral catheterization

1) Diagnostic or therapeutic drainage of the urinary bladder.

Contra indications of urethral catheterization

1) Urethral trauma (suspected or known).
2) Previous urethral surgery.
3) Lack of ability to traverse the urethra into the urinary bladder.

Equipment needed for urethral catheterization

You have Foley insertion trays that contain the most important materials:

1) Foley catheter of proper size, material, and configuration. The catheter is of standard length (46 cm) and comes in various calibers, numerically graded, with the larger number indicating a larger diameter.
   i. For short-term catheterization in men and women, a 14F or an 18F rubber catheter with a 5·mL balloon is appropriate.
   ii. Men with prostatic hypertrophy or after prostatic surgery may require larger catheters.
2) Sterile lubricant,
3) Antiseptic solution and cotton swabs to wash the male urethral meatus and the female vulva.
4) Sterile syringe to inflate the balloon.
5) Sterile gloves and towels mask and goggles.
6) Urinary drainage bag, connecting tube, and sterile specimen cup.

Personnel required for urethral catheterization

One physician or nurse can successfully carry out urethral catheterization. It is recommended that a female nurse be there when a male person inserts a catheter in a female patient and vice versa.

Patient preparation for urethral catheterization

You have to explain the procedure in details for appropriate patient’s cooperation. Informed consent is not required.

Patient positioning for urethral catheterization

Females: The patient should be supine with both legs raised (lithotomy position).
Males: The horizontal supine position is best.
Anatomy of external genitalia

1) **Females (Figure 20-3).** The urethral meatus lies in the superior fornix of the vulva, anterior to the vaginal opening and below the clitoris. It appears as a small dimple or cut in the midline (Figure 20-4.).

2) **Males (Figure 20-5).** The urethra leaves the bladder at the trigone, passes through the prostate, and traverses the penis to exit at the urethral meatus.

Figure 20-3. Anatomy of female external genitalia
Figure 20-4. Anatomy of female urethra

Figure 20-5. Anatomy of male external genitalia
The method of urethra catheterization in females
1) Choose the necessary catheter.
2) Don mask, goggles, and sterile gloves.
3) Drape the genital area with sterile towels.
4) Check the catheter is undamaged and open.
5) In the antiseptic packet moisten the cotton swabs.
6) Be sure the syringe is filled with enough sterile water to inflate the balloon.
7) With one hand (the left hand if standing on the patient's right side, or vice versa), spread the labia and identify the superior fornix with the clitoris at the apex. Thoroughly desinfect the entire area with four or five swabs. Start anteriorly and swab from front to back along the right and then the left side, and finally the outer area, using a new cotton swab for each pass (Figure 20-6).
8) The operator's other hand is considered contaminated; it should remain on the perineum during the procedure.
9) Hold the Foley catheter with the dominant hand, coat the tip and proximal portion with the lubricating jelly, and insert the catheter into the urethral meatus (Figure 20-7). Advance the catheter until urine returns. Collect the first specimen for analysis in a sterile cup. Then advance 4-5 cm farther to make certain the balloon is well within the bladder.
10) Fill the balloon with the appropriate amount of sterile water (5-8 mL), and withdraw the catheter until the balloon is snug against the trigone.
11) Attach the catheter to the drainage bag.
12) Tape the catheter and the drainage tube to the upper thigh.

Figure 20-6. The method of cleanse the female external genitalia prior to urethral catheterization
The method of urethra catheterization in males

1) Go on with steps nos. 1-6, above (written by female catheterization).

2) On of your hand (the left hand standing on the patient's right side or vice versa) to grasp the penis, so that the shaft lies in the palm and the glans of the penis is free but secure. Cleanse the glans with three or four antiseptic swabs.

3) Hold the catheter in the other hand and coat the tip of the catheter with Jelly. It is often helpful to also place some jelly on the meatus.

4) Place in the catheter into the meatus and advance the tip down the penile urethra to the base of the shaft (Figure 20-8).

5) Hold the penis at a 90-degree angle to the body and advance tile catheter through the membranous and prostatic urethra and into the bladder. Advance the catheter until urine returns. Collect the first specimen for analysis in a sterile specimen cup. Advance the catheter toward even if urine is obtained earlier. This will make certain that the balloon is not inflated in the urethra.

6) Fill the balloon with the proper amount of sterile water for its size, and withdraw the catheter until it is snug against the trigone (Figure 20-7).

7) Connect the drainage system and tape the catheter and drainage tube to the upper thigh.
Figure 20-8. Insertion of urethra catheter in male patient

Figure 20-9. Urethral catheter in vesica with balloon inflation
Possible complications of urethra catheterization

1) Long term cystitis, mechanic irritation.
2) Creation of false urethral passages.
3) Hematuria from urethra catheterization.

Patient follow-up after urethra catheterization

1) Take urine specimens for analysis and culture in cases of suspected urinary tract infection by puncturing the catheter with a 25. gauge needle and aspirating urine into a syringe. Do not break a connection in the catheter line in order to obtain the specimen; this will falsely contaminate the specimen.
2) Take out the Foley catheter as soon as possible.

4. Self assessment questions / answers Question/Answer

Question:
What is the indication and contraindication of urethral catheterization?

Answer:
Indications of urethral catheterization
- Urethral catheterization is used where diagnostic or therapeutic drainage of the urinary bladder.

Contraindications of urethral catheterization
- Suspected or known urethral trauma.
- Previous urethral surgery.
- Lack of ability to pass through the urethra into the urinary bladder.

Question:
What kind of equipment is needed to perform urethral catheterization?

Answer:
1) Foley catheter.
2) Sterile lubricant.
3) Antiseptic solution.
4) Cotton swabs.
5) Sterile syringe (with full of water) to inflate the balloon.
6) Sterile gloves.
7) Towels mask.
8) Goggles.
9) Urinary drainage bag.
10) Connecting tube.
11) Sterile specimen cup.

5. Cases in connection with urethra catheterization

Case 1
Three years ago a 67-year-old patient with prostate cancer was treated with drugs and irradiation after surgery. He was without any complain and clinical abnormalities until recently. He was admitted because of 24-hour urinal retention with suprapubic abdominal pain, and abdominal distension.

Question: What is the indication of urethra catheterization?
Answer: Therapeutic.

Case 2
A 24-year-old women suffered car accident and was admitted to intensive care unit because of polytrauma. Urethra injury could not be verified.

Question: During urethra catheterization what kind of precaution is needed?
Answer: Nil, urethra was not injured.

Case 3
A 45-year-old man with indwelling urinary bladder catheter due to complete spinal cord lesion complaints of high fever prior to cold shivers. We are thinking about the urinary infection.

Question: How can we take urine for bacterial culture?
Answer: With a 25 gauge needle we puncture the catheter and aspirate urine into a syringe for analysis.

Case 4
A 54-year-old man with moderate alcohol intoxication was sent for urologic examination, because of extreme abdominal distension in the suprapublic region. During that time only a female doctor was on duty.
Question: What kind of precaution is suggested to do in this situation to perform urethra catheterization?

Answer: It is recommended that a male assistant be present when a female physician inserts a catheter into a male patient.

Case 5

A 87-year-old patient was admitted to hospital because of carcinogenic shock. During management urethra catheter was inserted to check the minute-diuresis. During urine catheter insertion a moderate resistance and pain occurred in spite of holding the penis at a 90-degree angle to the body when we advanced thee catheters into the bladder.

Question: What was the cause of the pain?

Answer: It was caused by a prostate enlargement narrowing the prostatic urethra.

6. Reference/Suggested readings


Chesnutt MS, Dewar TN, Locksley RM: Office and bedside procedures. Appleton & Lange, 1992 (page 294-301)

7. Requirements – Urethral catheterization

The instructor’s role

- The practice is designed for students to perform urethral catheterization several times by their own hands.
- The instructor should expect from students the theoretical knowledge for practice. The practice does not serve the transfer of theoretical knowledge.

Specific tasks

- Description of equipment used in urethral catheterization.
- Description of personnel requirements for urethral catheterization.
- Demonstration of the methods of urethral catheterization in male and female patients.
- Supervision of the urethral catheterization performed by students and correction of failures.
- Reviewing the video recording made of the practice with students, and the analysis of each case.

The student’s role

- The student should prepare for the practice according to the best of his knowledge.
- The practice serves testing and exercise of urethral catheterization on phantom device.
Specific tasks:

- To carry out urethral catheterization several times on male phantom device.
- To carry out urethral catheterization several times on female phantom device.
- Reviewing the video recording made of the practice with the instructor, analysis of each cases.
- It is recommended to carry out all the techniques several times to acquire necessary experience.

8. Knowledge tests

Simple choice true/false

Encircle the T or F if the statement is true or false.

1. T F The urinary bladder is the organ that collects urine excreted by the kidneys before disposal by urination.

2. T F The Foley catheter is a double-lumen rubber tube with a large drainage channel and a smaller lumen for inflation of a balloon near the tip.

3. T F Suspected or known urethral trauma, and previous urethral surgery does not influence the result of insertion of urethra catheter.

4. T F In male patients with hyperplasia of prostate we use smaller catheter, as usual.

Multiple choices

5. Indicate the equipment needed for urethral catheterization, except two

   1) Foley catheter.
   2) Antibiotic injection
   3) Men with prostate hyperplasia or after prostatic surgery may require larger catheters.
   4) Sterile lubricant, antiseptic solution and cotton swabs
   5) Sterile syringe to inflate the balloon.
   6) Sterile gloves and towels mask and goggles.
   7) Sterile lancet
   8) Urinary drainage bag, connecting tube, and sterile specimen cup.

6. The possible complications of urethra catheterization, except two.

   1) Pyuria
   2) Persistent cystitis.
   3) Allergic reaction.
4) Haematuria.
5) Fever.
6) Arthritis.
7) Creation of false urethral passages.

Simple choice

7. What size of urethra catheter is used for routine, short-term catheterization in men?
   A. 2-4 F
   B. 6-8 F
   C. 14-18 F
   D. 20-26 F
   E. 28-32 F

8. Contraindications of urethral catheterization (simple choice)
   1) Children
   2) Suspected or known urethral trauma.
   3) Patients with tumor
   4) Treated patients with hemorrhagic diathesis.

9. List the statements in chronological order with mark of the serial number
   1) Be sure that the syringe is available and filled with enough sterile water to inflate the balloon, and that it is readily accessible. (6)
   2) The operator's other hand is considered contaminated; it should remain on the perineum during the procedure. (8)
   3) Wash hands and don mask, goggles, and sterile gloves. (2)
   4) In the antiseptic packet moisten the cotton swabs. (5)
   5) Take the Foley catheter in the dominant hand, coat the tip and proximal portion with the lubricating jelly, and insert the catheter into the urethral meatus, which lies just below the clitoris. Advance the catheter until urine appears. (9)
   6) Make sure that the catheter is undamaged and open. (4)
   7) Using one hand (the left hand if standing on the patient's right side, or vice versa), spread the labia and identify the superior fornix with the clitoris at the apex. (7)
   8) Drape the genital area with sterile towels. (3)
9) Choose the necessary catheter.(1)

10. Matching enter the letters in the numbered pair of expressions

A. Foley-catheter 1. Prostate hyperplasia
B. Short urethra 2. Recent urethra surgery
C. Contraindication 3. Inflation of a balloon
D. Call urology specialist 4. False urethral passages.
E. Complication 5. Female genitalia

Key: A3, B5, C2, D1, E4

Relation analysis

11. Chronic urinary tract infection is very rare in patients with indwelling catheters, because hematuria always occurs during insertion of urethra catheter. (E).

12. In cases of suspected urinary tract infection you have to take urine specimens for analysis and culture by puncturing the catheter with a needle and aspirating urine into a syringe, and it is sent to analysis and culture. (A).

13. You do not need to isolate the genital area with sterile towels, because the risk of the infection very high. (D).

14. In male patients the urethra leaves the bladder at the trigone, passes through the prostate, and traverses the penis to exit at the urethral meatus. In most men, the meatus is the narrowest position of the entire urethra (C).

20. Urethral catheterization requires an urinary drainage bag and sterile specimen cup. (B)

9. Reference


Chesnutt MS, Dewar TN, Locksley RM: Office and bedside procedures. Appleton & Lange, 1992 (page 294-301)
