Republic of Iraq
Ministry of Higher Education
Al-Mustaqbal University
Radiology Techniques Department
Second Stage \ Special Radiological Procedures-1

Lecture No. (10)

Micturating Cystourethrography

&

Ascending Urethrography in The Male

By

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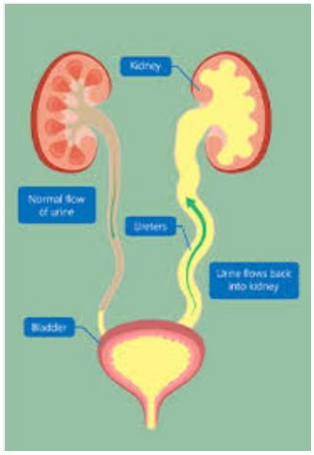
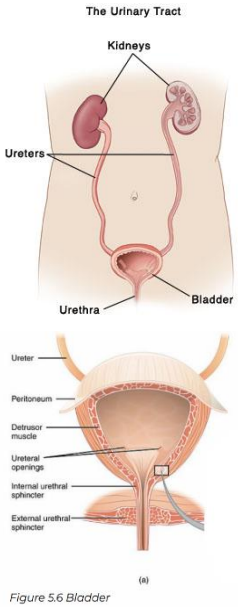
Micturating Cystourethrography

Indications

1. Vesicoureteric reflux
2. Study of the urethra during micturition
3. Bladder leak post-surgery or trauma
4. Urodynamic studies, e.g. for incontinence

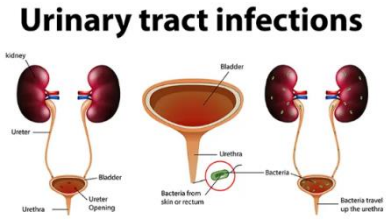




Contraindications

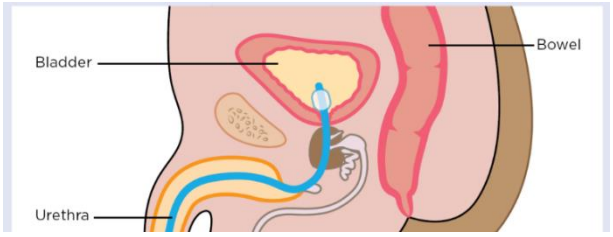
Acute urinary tract infection. (Contraindications & Complications)

Contrast Medium High osmolar contrast material (HOCM) or LOCM 150 mg I mL−1.



Equipment

1. Fluoroscopy unit with spot film device and tilting table
2. Video recorder (for urodynamics)
3. Bladder catheter



Patient Preparation

The patient empties their bladder prior to the examination.

Preliminary Image

Coned view of the bladder.

Technique

To **demonstrate** vesico-ureteric reflux (this indication is almost exclusively confined to children):

1. Using aseptic technique, the bladder is catheterized. Residual urine is drained.

2. Contrast medium (150 mg I mL−1) is slowly injected or dripped in with the patient supine, and bladder filling is observed by intermittent fluoroscopy. It is important that early filling is monitored by fluoroscopy in case the catheter is **malpositioned**, e.g. in the **distal ureter** or **vagina**.

3. Intermittent monitoring is also necessary to identify transient reflux. Any reflux should be recorded.

4. The catheter **should not be removed** until the radiologist is confident that the patient will be **able to micturate**, the patient does not tolerate further infusion or until no more contrast medium will drip into the bladder.

5. **Older children** and adults are given a urine receiver, but **smaller children** should be allowed to pass urine onto absorbent pads on which they can lie.

-Children can lie on the table, but **adults** will probably find it easier to **micturate** while standing erect.

-In **infants** and **children** with a neuropathic bladder, micturition may be accomplished by suprapubic pressure.

6. Spot images are taken during micturition, and any reflux is recorded. A video recording may be useful.

✓ The lower ureter is best seen in the anterior oblique position of that side.

✓ Boys should micturate in an oblique or lateral projection, so that spot films can be taken of the entire urethra.

7. Finally, a full-length view of the abdomen is taken to demonstrate any undetected reflux of contrast medium that might have occurred into the kidneys and to record the postmicturition residue.

8. Lateral views are helpful when fistulation into the rectum or vagina are suspected.

9. Oblique views are needed when **evaluating** for leaks.

10. Stress views are used for urodynamic studies.

Aftercare

1. No special aftercare is necessary, but patients and parents of children should be **warned** that dysuria, possibly leading to **retention of urine**, may rarely be experienced.

✓ In such cases a simple analgesic is helpful, and children may be helped by allowing them to micturate in a warm bath.

2. Most children will already be receiving antibiotics for their recent urinary tract infection—the dose will usually be doubled for 3 days, starting on the day prior to the procedure. Children not already on antibiotics will also usually be prescribed a 3-day course (often trimethoprim).

Complications

1. Urinary tract infection (Contraindications & Complications)

2. Catheter trauma may lead to dysuria, frequency, haematuria and urinary retention.

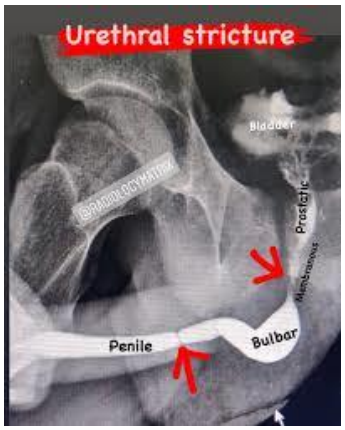
3. Complications of bladder filling, e.g. perforation from overdistension (catheter); prevented by using a nonretaining catheter, e.g. Jacques

4. Catheterization of vagina **or** an ectopic ureteral orifice

5. Retention of a Foley catheter

Ascending Urethrography in The Male

Indications



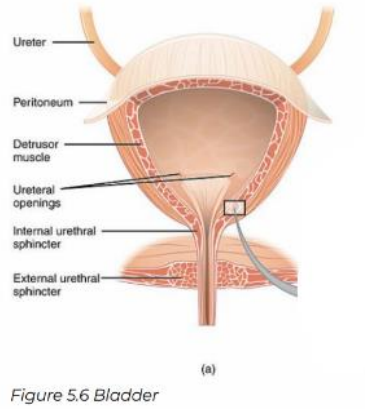


Figure 5.6 Bladder

1. Stricture

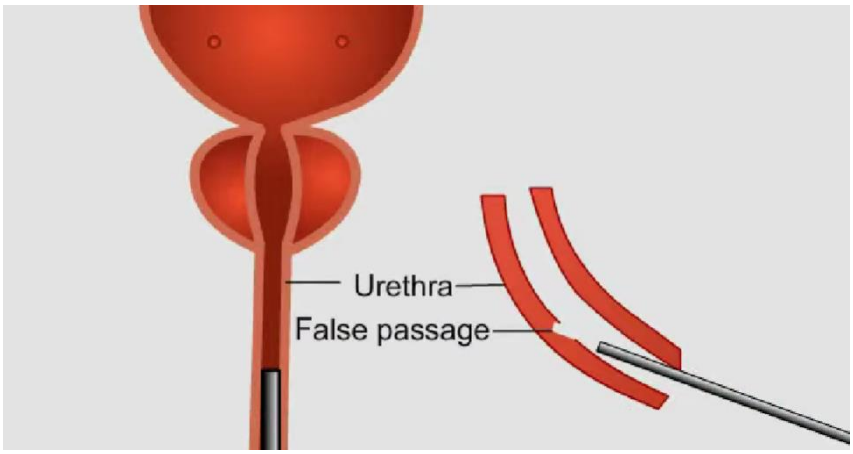
2. Urethral trauma

(Indications & Complications)

3. Fistulae or false passage

4. Congenital abnormalities

Contraindications



1. Acute urinary tract infection

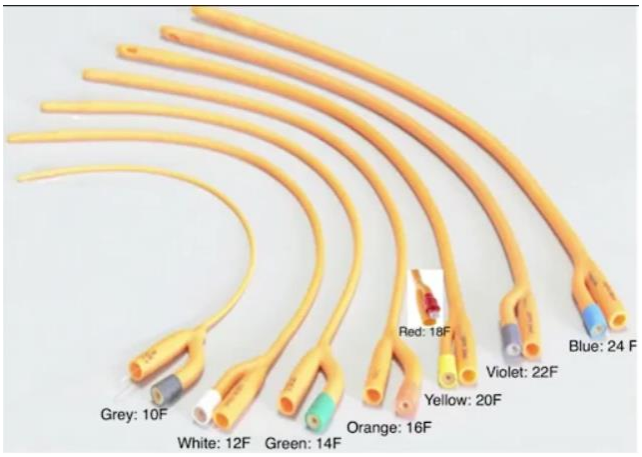
(Contraindications & Complications)

2. Recent instrumentation

Contrast Medium

LOCM 200–300 mg I mL−1 20 mL. **Prewarming** the contrast medium will help reduce the incidence of spasm of the external sphincter.

Equipment



1. Fluoroscopy unit and spot film device

2. Foley catheter 8-F.

Patient Preparation: - Consent.

Preliminary Image

Coned supine posteroanterior (PA) of the bladder base and urethra.

TECHNIQUE

1. Patient supine

2. The catheter is connected to a **50 mL syringe** containing contrast medium and **flushed to** eliminate air bubbles.

3. Using aseptic technique, the tip of the catheter is inserted so that the **balloon** lies in the fossa navicularis (i.e. **immediately proximal to the meatus within the glans**), and its balloon is inflated with 2–3 mL of water to **anchor the catheter** and **occlude the meatus**.

4. Contrast medium is injected under fluoroscopic control, and **steep** (30–45°) oblique films are taken. Gentle traction on the catheter **is used to** straighten the penis over the ipsilateral leg and prevent urethral overlap or foreshortening from obscuring pathology.

***Depending on the clinical indication**, **ascending urethrography** may be followed by **descending micturating cystourethrography** to demonstrate the proximal urethra and bladder, assuming there is

no contraindication to **bladder catheterization**, e.g. false passage, stricture.

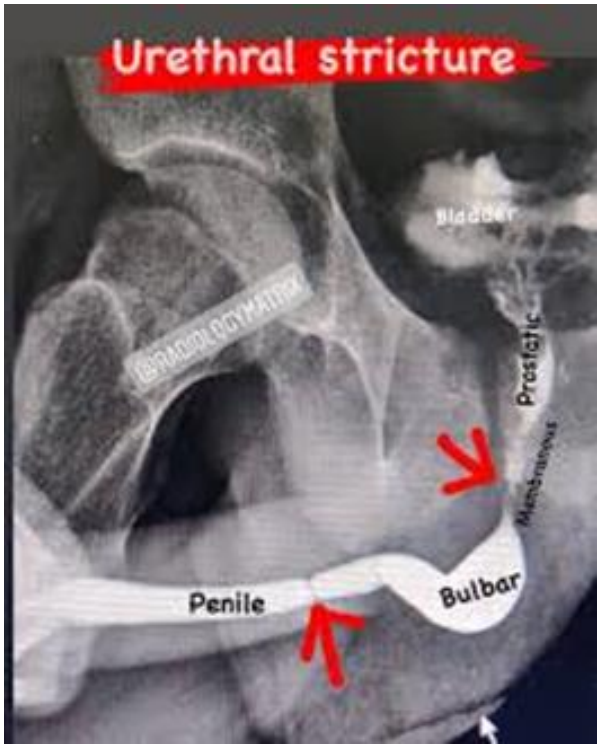
*It may be possible to **fill the bladder** retrogradely **via the urethral catheter** if the patient is able to relax the bladder neck (and thus **avoid bladder catheterization**).

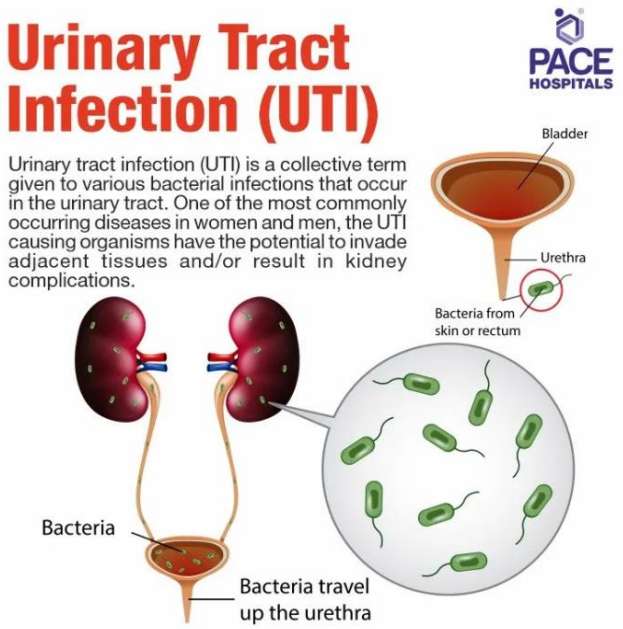
Complications Due to the Technique

1. Acute urinary tract infection (Contraindications & Complications)

2. Urethral trauma (Indications & Complications)

3. Intravasation of contrast medium, **especially** if excessive pressure is used to overcome a stricture.





What are the symptoms of neurogenic bladder?

- Unable to control urine (urinary incontinence)
- Small amount of urine when urinating.
- Urinary frequency
- Dribbling urine.
- Loss of feeling that the bladder is full.
- Unable to urinate.

1-The patient position that is recommended to visualize the lower ureter during micturating cystourethrography is

A. Anterior oblique position B. Supine position C. Prone position

D. Lateral position E. Full-length supine AP position

Q2-The oblique views that are performed in a voiding cystourethrogram procedure are used

A. To assess urethral trauma B. To examine a fistula or false passage

C. To evaluate leaks D. To monitor the completeness of bladder filling

E. For urodynamic studies

Q3-The purpose of lateral views in micturating cystourethrography studies is

A. To evaluate for leaks B. To detect urinary tract infections

C. To assess bladder filling complications D. To diagnose urethral trauma

E. To detect fistulation

Q4-The most serious complication of bladder filling during micturating cystourethrography is

A. Perforation B. Infection C. Allergy D. Contraction E. Hemorrhage

Q5-What is the primary indication for performing a micturating cystourethrogram (MCU)?

A. Kidney stones B. Vesicoureteric reflux C. Prostate enlargement

D. Bladder cancer E. Ureteropelvic junction obstruction

Q6-What is a contraindication for performing MCU?

A. Neurogenic bladder B. Acute urinary tract infection

C. Previous vesicoureteric reflux D. Hydronephrosis

E. Bladder diverticulum

Q7-Which contrast medium is typically used for MCU?

A) Barium sulfate B) Low osmolar contrast material (LOCM) and (HOCM)

C) Gadolinium D) Iodinated oil-based contrast E) Paramagnetic contrast

Q8-What is the purpose of using fluoroscopy in MCU?

A) To evaluate renal parenchymal function

B) To visualize dynamic filling and voiding of the bladder

C) To assess renal perfusion

D) To measure bladder capacity

E) To detect renal stones

Q9-What is the most common patient population undergoing MCU for vesicoureteric reflux?

A) Adults with incontinence B) Infants and children C) Elderly patients

D) Pregnant women E) Patients with renal failure

Q10-What should be done before performing an MCU?

A) The patient should drink plenty of fluids

B) The patient should empty their bladder

C) A diuretic should be given

D) The patient should be sedated

E) The patient should be in a fasting state

Q11-What is the purpose of intermittent fluoroscopic monitoring during bladder filling?

A) To detect renal artery stenosis

B) To identify transient vesicoureteric reflux

C) To evaluate urethral stricture

D) To measure urine output

E) To assess prostate size

Q12-In which position should boys be during voiding to obtain optimal urethral imaging?

A. Supine B. Prone C. Oblique or lateral
D. Sitting E. Trendelenburg

Q13-What should be done if a child cannot void during MCU?

A) The catheter should be left in place for 24 hours

B) The procedure should be repeated immediately

C) Suprapubic pressure should be applied

D) The child should be sedated

E) The test should be canceled

…….

1- Which of the following is NOT a common indication for ascending urethrography?

a) Stricture b) Urethral trauma c) Renal calculi d) Fistulae

e) Congenital abnormalities

2- What is the primary contraindication for ascending urethrography?

a) Diabetes mellitus b) Acute urinary tract infection c) Hypertension

d) Recent bowel surgery e) History of allergies

3- The recommended volume of contrast medium for ascending urethrography is typically:

a) 5 mL b) 10 mL c) 20 mL d) 30 mL e) 40 mL

4- What is the purpose of prewarming the contrast medium?

a) To increase its viscosity

b) To reduce the risk of allergic reactions

c) To decrease the risk of spasm of the external sphincter

d) To improve its radiographic contrast

e) To speed up the injection time

5- Which of the following equipment is not typically used during ascending urethrography?

a) Fluoroscopy unit b) Spot film device c) Foley catheter

d) Endoscope e) Syringe

6- Where should the Foley catheter balloon be inflated during the procedure?

a) In the bladder

b) In the prostatic urethra

c) In the membranous urethra

d) In the fossa navicularis

e) In the bulbar urethra

7- What is the most common complication of ascending urethrography?

a) Bleeding b) Allergic reaction c) Acute urinary tract infection

d) Urethral stricture e) Radiation exposure

8-What is the most common complication of ascending urethrography?

A. Acute urinary tract infection

B. Intravasation of contrast medium

C. Bladder perforation

D. Urethral trauma

E. Allergic reaction to contrast medium

9-What is the possible cause of urethral trauma during ascending urethrography?

A. Malposition of the catheter or clamp

B. Inflation of the balloon in the urethra

C. Injection of contrast medium with high pressure

D. All of the above

E. None of the above

10- Intravasation of contrast medium is a potential complication that can be minimized by:

a) Using a larger volume of contrast

b) Injecting the contrast rapidly

c) Avoiding the use of fluoroscopy

d) Avoiding excessive pressure during injection

e) Pre-medicating the patient with steroids

11- What is the typical size of the Foley catheter used for ascending urethrography?

a) 4-F b) 6-F c) 8-F d) 10-F e) 12-F

12- What is the typical volume of water used to inflate the Foley catheter balloon?

a) 1-2 mL b) 2-3 mL c) 3-4 mL d) 4-5 mL e) 5-6 Ml

13-Regarding to ascending urethrography in the male, prewarming the contrast medium can reduce the incidence of .....

A. Spasm of the external sphincter

B. Dose of contrast medium

C. Image quality

D. Contrast resolution

E. None of the above

14. The main indication for performing ascending urethrography in the male is....

A. Acute urinary tract infection B. Neurogenic bladder

C. Bladder cancer D. Stricture E. Urinary retention

15. The following methods are used for imaging the urinary tract except.....

A. Retrograde pyeloureterography B. Micturating cystourethrography

C. Ascending urethrography D. Hysterosalpingography

E. Antegrade pyelography

16. What is the preliminary image taken in ascending urethrography in males?

A. Lateral view of the kidneys and ureters

B. Oblique view of the prostate gland

C. Coned supine posteroanterior (PA) of the bladder base and urethra

D. Anteroposterior (AP) view of the urinary bladder

E. None of the above