Radiology Techniques Department

Special Radiological Procedures-1

lecture 7

Methods of Imaging the Urinary Tract

Excretion urography (intravenous urography [IVU])

By

MR.T Hussein Ayyed

MS.c Nariman Neamah

Methods of Imaging the Urinary Tract

Q/ There are many methods of imaging the urinary tract but the most common used:

1. Plain radiography

2. Excretion urography (intravenous urogram [IVU])

3. Micturating cystography and cystourethrography

4. Ultrasound (US)

5. Computed tomography (CT)

6. Magnetic resonance imaging (MRI):

Excretion urography (intravenous urogram [IVU])

Intravenous urography (IVU), also referred to as intravenous pyelography (IVP) or excretory urography (EU), is a radiographic study of the renal parenchyma, pelvicalyceal system, ureters and the urinary bladder. This exam has been largely replaced by CT urography.

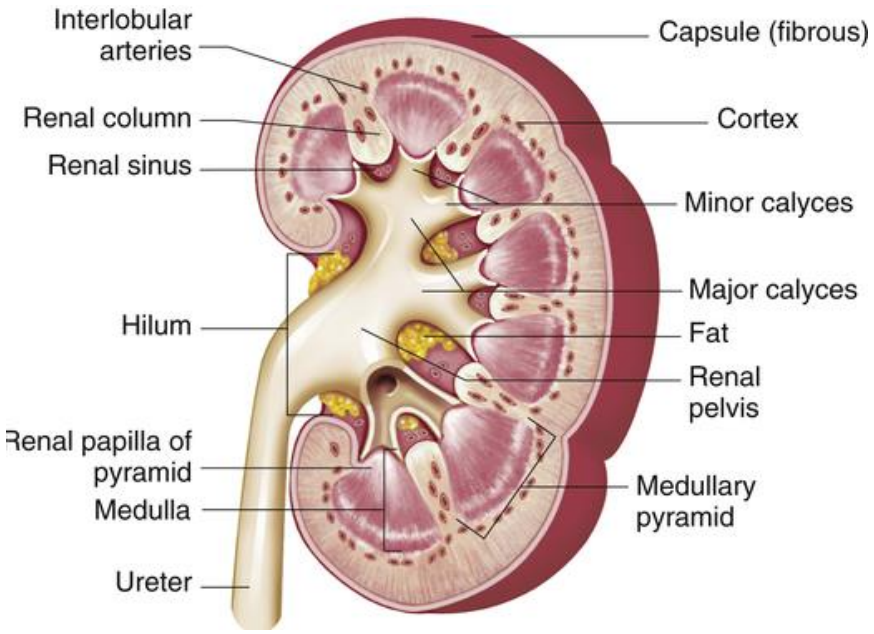


Figure (1). Anatomy of kidney

Indications

1. assessment normal function of kidneys

2. congenital abnormalities

3. urinary tract obstruction (UT obstruction)

Contraindications

1. renal impairment.
2. Hypersensitivity to contrast media

Contrast Medium

Low osmolar contrast material (LOCM) 350–370 mg I mL−1

Patient Preparation

1. No food for 6 h prior to the examination.
2. check blood urea and serum creatinine levels

Preliminary image

Plain film (KUB) kidney, ureter and bladder to assessment

1. patient preparation
2. radiopaque calculi
3. calcification

Technique

I.V. cannula, rapidly injection should be given to maximize the density of the nephrogram. **Cassette size =14x17 inch**.

Images

1. **Immediate film**. AP of the renal areas. This **film** is **exposed 10–14 s after** the injection. **It aims to *show* the nephrogram at its most dense**.

2. **5-min film**. AP of the renal areas. **It aims to *give* an initial assessment of pathology**—specifically the presence or absence of **obstruction** before administering compression.

*A compression band is then applied positioned **midway between the anterior superior iliac spines**—i.e. over the ureters as they cross the pelvic brim. **Aim of compression band is to *produce* pelvicalyceal distension**.

Compression is contraindicated:

(a) after recent abdominal surgery

(b) after renal trauma

(c) if there is a large abdominal mass or aortic aneurysm

3. **10 min film**. AP of the renal areas. There is usually adequate distension of the pelvicalyceal systems with urine by this time.

*Compression is released when satisfactory demonstration of the pelvicalyceal system has been achieved.

If the compression film is inadequate, the compression should be checked and repositioned if necessary and a further **50 mL** of contrast medium administered and a repeat film taken **after 5 min**.

4. **Release film (20 min)**. Full-length supine AP abdomen taken immediately after the release of compression. **It aims to *show* the ureters.**

*If this film is satisfactory, the patient is asked to empty the bladder.

5. **After micturition film**. Full-length supine AP abdomen.

The aims of this film are:

1. to assess bladder emptying

2. to demonstrate drainage of the upper tracts

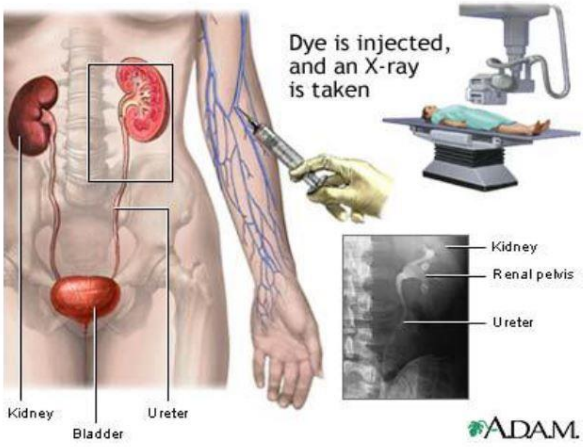
3. to confirm ureterovesical junction calculi

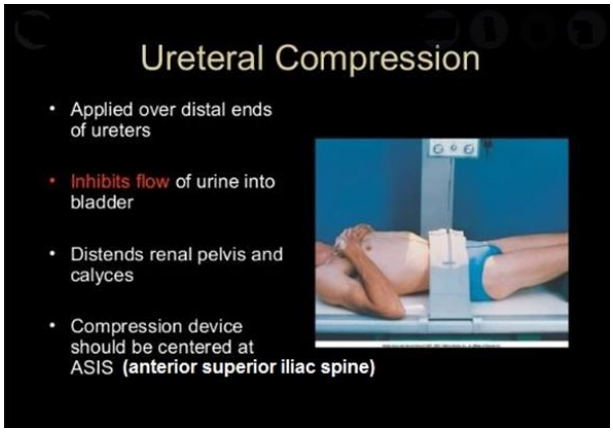
Additional Images

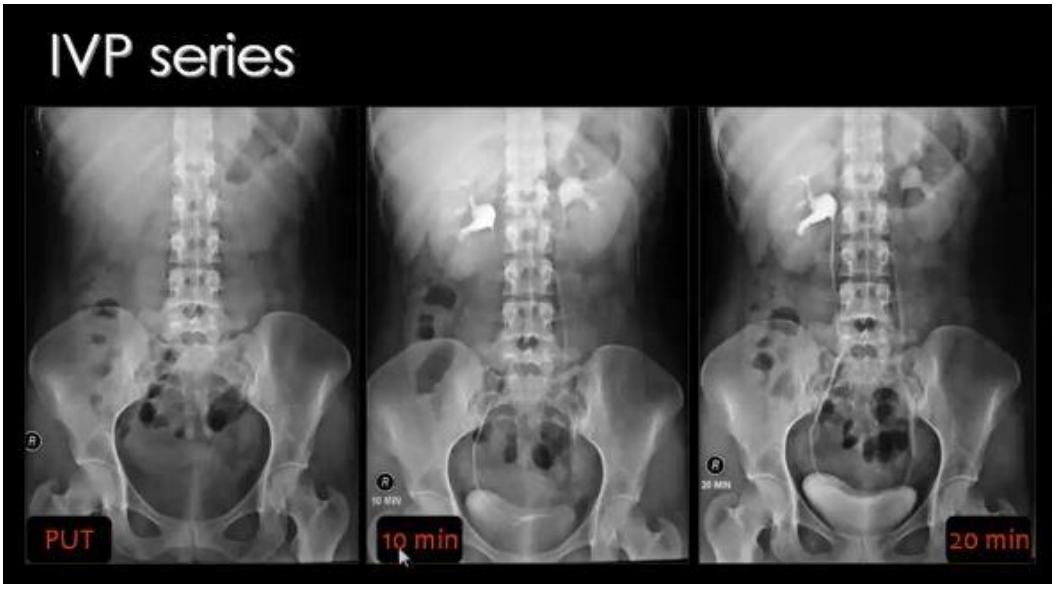
1. **35° posterior oblique** of the kidneys, ureters or bladder—for equivocal collecting system **lesions** or localization of **calculi**

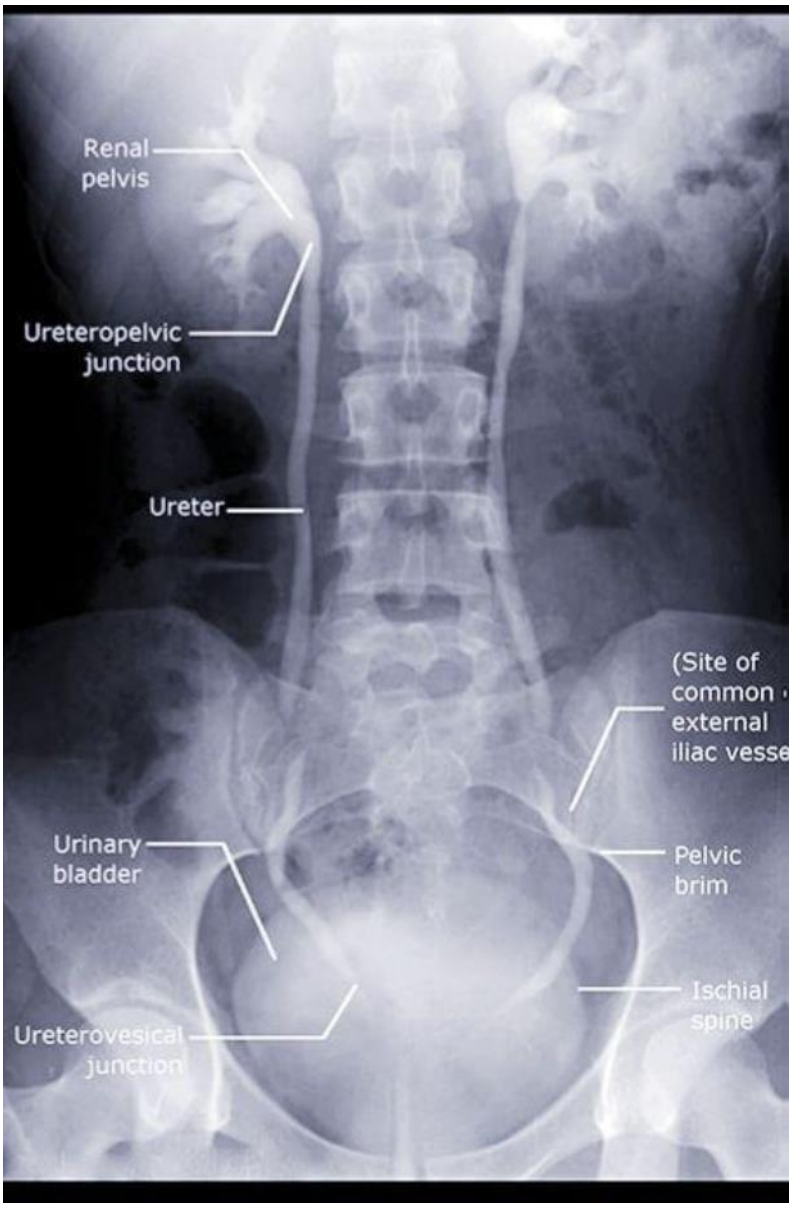
2. **Prone abdomen** following the release film—may improve **visualization** of **distal ureters**

3. Delayed films up to **24 h** after injection in **renal obstruction**






IVP series
PUT
10 min
20 min


Renal pelvis
Ureteropelvic junction
Ureter
(Site of common external iliac vesse
Urinary bladder
Pelvic brim
Ischial spine
Ureterovesical junction