



**Radiology Techniques Department**

**Special Radiological Procedures-1**

**lecture 7**

***Methods of Imaging the Urinary Tract***

***Excretion urography (intravenous urography [IVU])***

**By**

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## 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.

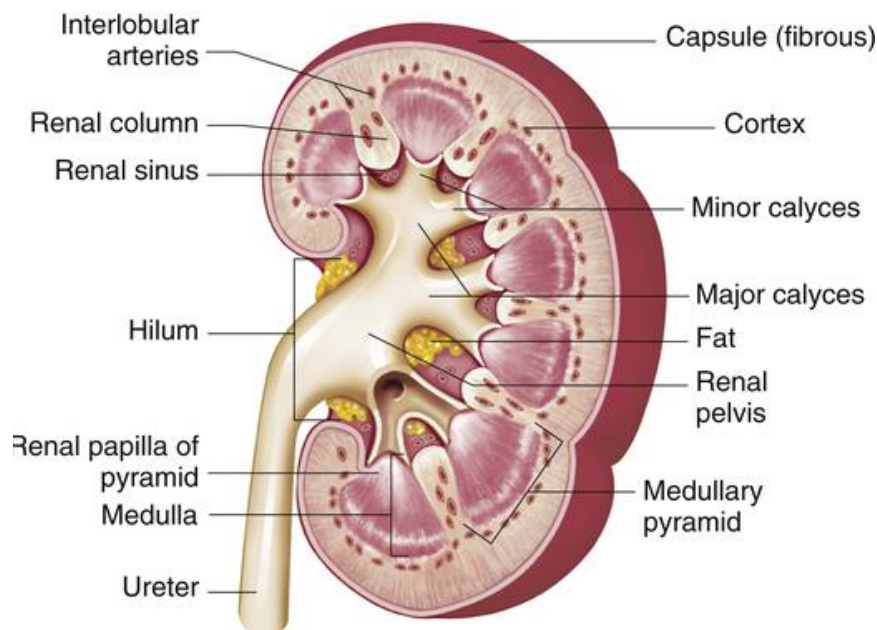


Figure (1). Anatomy of kidney

## 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<sup>-1</sup>

## 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.

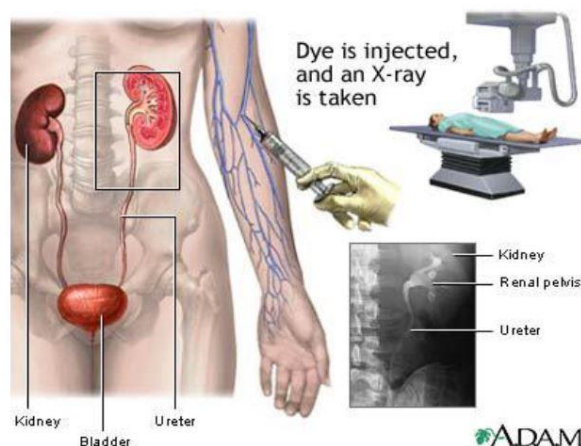
5. **After micturition film**. Full-length supine AP abdomen.

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**



### Ureteral Compression

- Applied over distal ends of ureters
- **Inhibits flow** of urine into bladder
- Distends renal pelvis and calyces
- Compression device should be centered at ASIS (**anterior superior iliac spine**)

ASIS

# IVP series

