

Methods of Investigation

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4- **Computed Tomo graphy**

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6- **Scintigraphy**

7 Direct contrast investigation

- Retrograde Pyelography

- Cysto graphy

- Urethro graphy

8- **Percutaneous interventional procedures**

- **Ante grade Pyelography**

9- **Vascular procedure**

-**Renal Angiography**

Plain films

The standard plain radiographic imaging of the urinary tract is the KUB (kidneys; Ureters , Bladder) Which consist of a full length abdomen film, taken with the patient supine.

The cassette positioned with the lower border at the symphysis pubis to ensure the urethra is included in the film.

It,s used for :

1.identify all calcification that present in renal area.the major causes for UT calcification are urinary calculi , nephrocalcinosis , & prostatic calcification.

2. look at other structure in the film including the bones.

Intra venous Urography:-I .V .U

Is the classic routine investigation of urology. Its use has been largely replaced by u/s . The I.V.U. consist of a series of plain film taken after injection of an intra venous water soluble iodine containing contrast media. The main indication of I.V.U.are

1. Inv. Of haematuria
2. Inv. Of renal calculi.
3. Uretric colic & fistula.
4. Complex urinary tract infection.
5. Congenital abn. Of renal sys.

The classical series of plain film immediate, 5 & 15 minute, full length release & post micturition.

On I.V.U. series it,s imp. To check

1. The position of the kid.

2. Renal outline to detect any local indentation or bulge.
3. Renal length =10-16 cm due to radiographic magnification.
4. Calicies:the shape of normal calix is cupped , when it is dilated it become clupped. Caliceal diltation has 2 basic causes obstruction & destruction of the papilla.
5. Renal pelvis & ureter the normal renal pelvis & PUJ are funnel shaped it is important to asses dilatation the main cause for it is distal obstruction& to find filling defect within the pelvis & puj. DDX calculi ,tumor & bl. Clot.

- Ultra sound –

- The most frequently performed radiological investigation of the urinary tract & the first line investigation in most patients providing anatomical information without requiring ionizing radiation , the main use of u/s

1. Inv. Pat. With UT symptoms
2. Demonstrate the size of the kid. & exclude hydronephrosis in pat. With renal failure.
3. DX hydronephrosis , renal tu. Abscess & cysts including p.c.dis.
4. Asses bladder & prostate
5. Secrotal u/s for mass lesion including hydrocele & to localize & asses ectopic testicle.

CT YROGRAPHY

CT urography is a term used to describe a contrast-enhanced CT technique designed to provide excellent delineation of the renal collecting systems, ureters and bladder, as well as cross-sectional images of the kidneys and adjacent structures. It consists of a multiphase examination including scans performed with sufficient delay after contrast material injection to allow opacification of the collecting systems and ureters.

Scintigraphy

is used to assess renal function and urodynamics, including calculation of the percentage of total renal function contributed by each kidney. Renal scintigraphy is used in renal transplant to assess transplant perfusion and function, diagnose rejection or acute tubular necrosis, and detect urinary leak or outflow obstruction.

- **Retrograde Pyelography its involve direct injection of contrast material into pelvi caliceal system or ureter through catheter placed via cystoscopy. The indications are limited to those situation where the information can not be achieved by less invasive mean for e.g. non functioning kid. & cases where further information about nature of the obstruction is required.**

- Cystography Can be classified into 3 groups :

1. Micturating cystourethrography (MCUG)
primarily performed for the assessment of vesicouretric reflux in childhood

2. Dynamic Cysto graphy

- 3 . Simple cysto graphy :Frequently performed in adult

Used to assess the integrity of the bladder following trauma or surgery or to investigate suspected fistula involving the bladder

- Urethrography:

Can be performed via an ascending or descending approach

- 1 .Descending approach Is usually part of micturation cysto gram can be used in both sex .

2. Ascending urethrography is essentially Confined to male its used in trauma ,strictures and fistulas.

Congenital anomalies

1- Bifid collecting Sys.

The commonest congenital, unlit or billet, the pcs & Ureters may be divided for a variable distance sometime

just the pelvis is bifid at the other extreme the 2 ureters may be Separate throughout their length & have separate opening into the bladder .

The ureter draining the upper moiety has an ectopic opening into the bladder , vagina, urethra & ass .with incontinence, urethrocele & obstruction, the ureter draining the lower moiety drain at the trigon but ass. with VUR.

2- Uretrocele

These are sub mucosal dilatation of the intra mural distal ureter can be divided to:-

- Ectopic ureterocele :

Occur in pat . with complete uretric duplication affecting the ureter draining the upper moiety .

- Simple ureterocel

It is associated with increase risk of inf. & stone formation.

Radiologically

1- As contrast –Filled structure with a thin smooth radiolucent wall surrounded by contrast in the bladder(cobras head)

2- well defined radiolucent mass within the opacified bladder. In case of obstructed urethrocele in non functioning kidney .

3- Ectopic kidney :-

Failure of complete ascent of the kidney to the level of the 2nd L.V. , the kidney coming to lie anywhere from the pelvis upward .the kid. Are usually located in the lower abd. & rotated so that the pelvis of the kid. Point forward, the ureter is short & travels directly to the bladder.

Chronic pyelonephritis , hydronephrosis & calculi are all more common in ectopic kid. But they are often incidental finding. **Some times the kidneys remain fused & both lie on the same side of the abdomen (Crossed fused ectopia)**

4- Rotated kidney :-

One or both kidney may point anteriorly instead of medially

5-fusion anomalies:-

-Horse show kidney

the kidney fail to separate ,Almost invariably it's the lower pole that remain fused. the Kidney appears too close to the spine with the lower poles lie closer to spine, usually Ectopic, lies lower than normal kidney & **Isthmus usually anterior to aorta and inferior vena cava**

6- PUJ obstruction .