



CT UROGRAM: Why The Wait?

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Meet The Team





Definition of CTU

European Society of Urogenital Radiology:

“A diagnostic examination optimized for imaging the kidneys, ureters and bladder with thin slice MDCT, IV contrast agent administration and images acquired in the excretory phase”



Before CTU

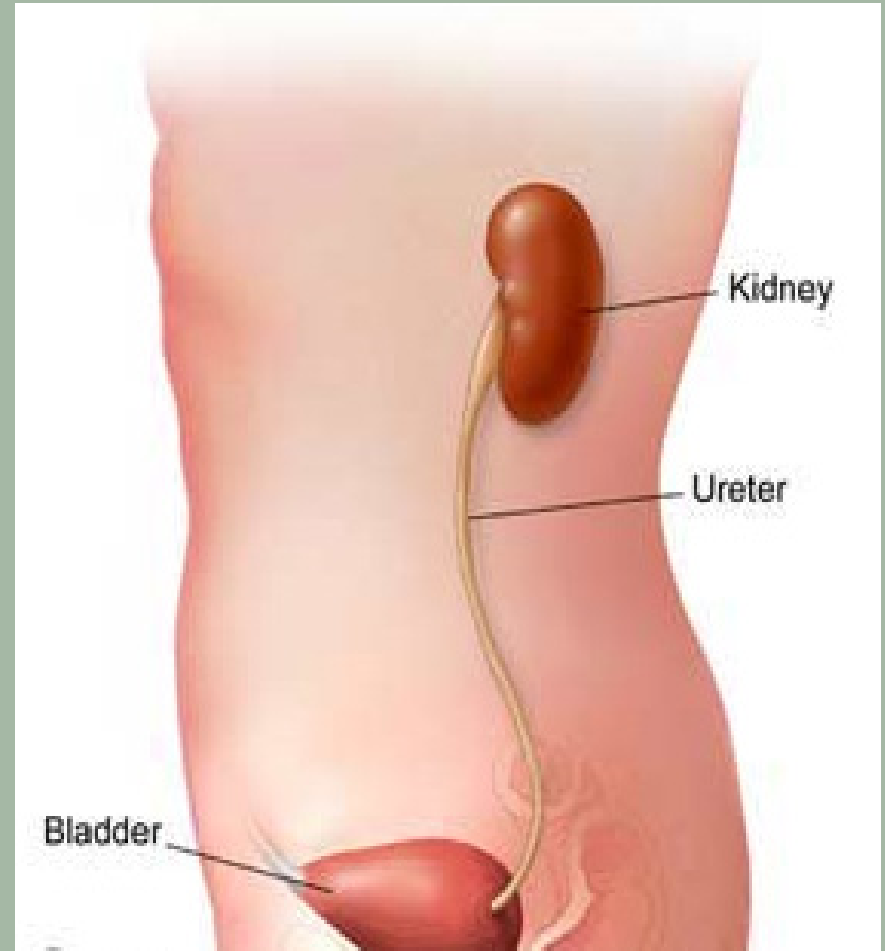
IVU: To demonstrate the entire urinary tract radiographically showing both the structure and function of the kidneys

- Control Film
- Immediate (kidneys only)
 - 5min Film
 - 10 min compression
 - Full Length release
 - Micturition Film



Goal of CTU

....to obtain images of fully opacified and distended collecting systems, ureters and bladder- all with the least number of scans.....





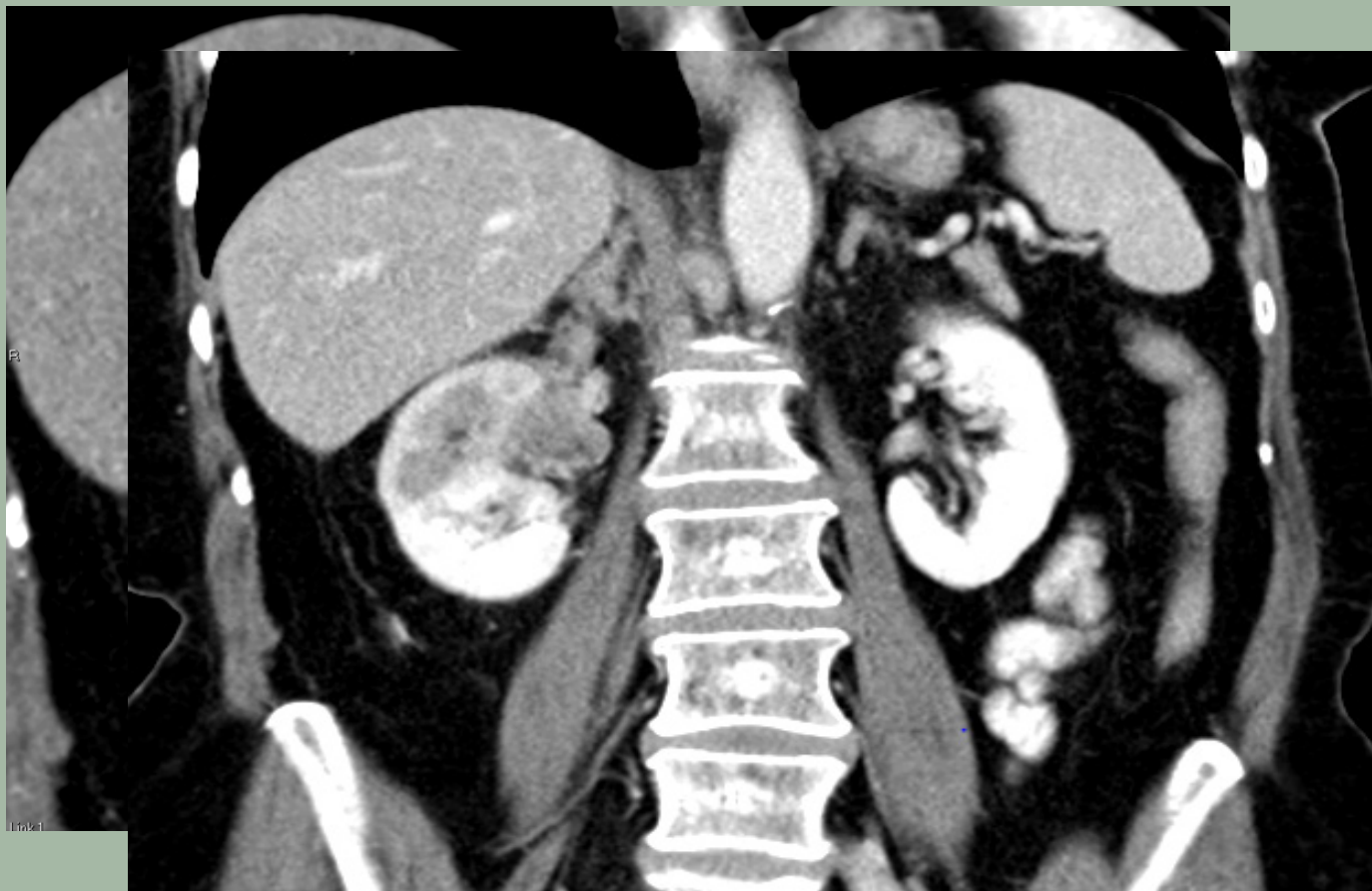
What Are We Looking For?

- Renal Masses: RCC & TCC
- Calculi
- Genitourinary trauma
- Renal infection
- Haematuria
- ?Incidental Findings





What Not To Do!





Our Protocols: Rad Team A

- Drink 500ml 40 minute before the scan
- Pre KUB (low dose)
- 50ml IV Contrast. No scan.
- 600s delay
- 50ml IV Contrast
- Post 70s delay

Our Protocols: Rad Team B

- Drink 1000mls water. Wait 40 mins
- Change patient. Empty bladder.
- Pre KUB (low dose)
- 100mls contrast. No scan
- 720s delay
- 50mls IV contrast
- Arterial Abdo/ Pelvis on expiration



The Common Threads

- WATER PRIOR TO THE SCAN
- PRE CONTRAST KUB (low dose)
- SPLIT BOLUS
- 10- 12 MINUTE DELAY



DIFFERENCES

- Delay applied to split-bolus
- Fractioned Dose
- Arterial versus PV phase

Data Acquisition/ Reconstructions

- Omnipaque 300, pink venfalon
- Care kV. Ref kV: 120
- Care mA. Ref mA: 280



Post Processing

- All images reviewed axially
- Excretory phase is also reconstructed in the coronal and sagittal plane (helps detect small urothelial tumours)

....Can also do curved planar reformats, MIPs with/without bone, colourised VR scans.....

Silverman et al (2009)





Ancillary Maneuvers/ Techniques

- Furosemide IV (0.1mg/kg)

- Compression
 - Higher opacification for mid and distal ureter [McNicholas et al (1998) & Caoili et al (2002)]
 - May not be applied in some patients, such as those with abdominal aortic aneurysm

Ancillary Maneuvers/ Techniques

- Patient Moving
 - 2 topograms
 - Kim et al (2008). Log-rolling. No difference in ureteral opacification
- Prone Imaging
 - Improves ureteric distension and opacification
 - Free intravesical/ impacted in ureterovesical junction stones
 - Uncomfortable and benefits disputed



Next Steps: Auditing Local Practice

Opacification of the Renal Collecting System during CT Urography (AuditLive-100+, RCR, 2010)

STANDARD

- No nationally agreed standard
- Literature assesses opacification in various ways
- Kawamoto et al (2006) method adapted:
 - Renal Calices and Infundibula
 - Renal Pelvis
 - Upper Ureter
 - Lower Ureter



Next Steps: Auditing Local Practice

TARGET

- Opacification is assessed on a 1-3 likert scale
 - 3=Complete opacification
 - 2=Near complete opacification
 - 1=No or poor opacification

Renal Calices & Infudibula	95% CI
Renal Pelvis	95% CI
Upper Ureter	85% CI
Lower Ureter	75% CI

SUGGESTIONS FOR CHANGE

RESOURCES





Finally.....

.....not just how long you wait but rather what you do/ don't do during this time which impacts the quality of the imaging produced.....