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 Maneuverers/ Techniques

• Furosemide IV (0.1mg/kg)

• Compression
  - May not be applied in some patients, such as those with abdominal aortic aneurysm
Ancillary Maneuverers/ Techniques

• Patient Moving
  - 2 topograms

• 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 Infudibula
  - 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

<table>
<thead>
<tr>
<th>Area</th>
<th>CI Width</th>
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<tbody>
<tr>
<td>Renal Calices &amp; Infudibula</td>
<td>95%</td>
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<tr>
<td>Renal Pelvis</td>
<td>95%</td>
</tr>
<tr>
<td>Upper Ureter</td>
<td>85%</td>
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<tr>
<td>Lower Ureter</td>
<td>75%</td>
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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.......