40 year old female presents with flank pain

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Obstructive Uropathy
Severe hydroureteronephrosis secondary to a large proximal ureteral stone
Right kidney shows absent perfusion during the angiographic phase as well as absent uptake.
Renogram

Table of Result Summary

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Split Function (%)</td>
<td>89.4</td>
<td>10.6</td>
</tr>
<tr>
<td>Kidney Counts (cpm)</td>
<td>110756</td>
<td>13137</td>
</tr>
<tr>
<td>Kidney Depth (cm)</td>
<td>8.934</td>
<td>8.996</td>
</tr>
<tr>
<td>Renal Retention</td>
<td>0.460</td>
<td>0.320</td>
</tr>
<tr>
<td>Time of Max (min)</td>
<td>3.001</td>
<td>0.400</td>
</tr>
<tr>
<td>Time of ½ Max (min)</td>
<td>14.7</td>
<td>0.445</td>
</tr>
<tr>
<td>Time from Max to ½ Max (min)</td>
<td>11.7</td>
<td>0.045</td>
</tr>
</tbody>
</table>

Kidney

Flow

UCONN HEALTH
RADIOLOGY
Renogram

**Tc-99m MAG 3:**
- Mechanism: **Tubular Secretion**
- Dose: 10-20 mCi
- Estimates: **Effective renal plasma flow (ERPF)** which estimates renal clearance (80% secretion and 20% GFR)
- **ADVANTAGE**: protein bound and provides better target to background than DTPA
- **DISADVANTAGE**: Indirectly shows renal function

**Tc-99m DTPA:**
- Mechanism: Glomerular Filtration
- Dose: 10-20 mCi
- Estimates: GFR
- **ADVANTAGE**: Great for renal physiology (function)
- **DISADVANTAGE**: Poor imaging characteristics in cases of renal insufficiency

**TECHNIQUE/ANALYSIS:**
“Angiogram”: 1 second per frame x 60 seconds
“Nephrogram”: 30-45 minutes at 2-3 minutes intervals

**Split function**: measure counts in the ROI’s at 2-3 minutes, before excretion occurs

**Clearance metrics:**
- Time to peak - quicker the better. In general, normal is 3-5 minutes
- T1/2 clearance - quicker the better. Normal is 7-10 minutes
- Fraction remaining at 20 minutes - lesser the better
**Diuretic Renogram** is performed to evaluate whether a persistent nephrogram is secondary to obstruction or not. If Lasix triggers drainage, then it’s not obstructed.

In our case, Lasix was not required.

Dose: 0.3-0.5 mg/kg in adults = 20-40 mg, 80 mg or more for patients with renal failure or on chronic Lasix

Dose: 1 mg/kg in infants = 5-10 mg

Bladder needs to be empty - put in a Foley if needed.

**Classification**
- “Normal” = T1/2 < 10 minutes
- “Indeterminate for obstruction” = 10 - 20 minutes
- “Mechanical obstruction” = T1/2 > 20 minutes
References:

1. Radiopedia.com


