RADIONUCLIDE CYSTOGRAPHY

Primary Indications: Radionuclide cystography is most often indicated in children who present with recurrent urinary tract infection.

Rationale: A common cause of recurrent urinary tract infections is vesico-ureteral reflux. Radionuclide cystography can document the presence and severity of the vesico-ureteral reflux and can be used to monitor whether it has resolved over time.

Interfering Conditions: Known urethral abnormalities that could make catheterization difficult.

Contraindications: Active urinary tract infection.

Precautions: Strict aseptic technique must be used for the catheterization.

Radiopharmaceutical: Tc-99m pertechnetate

Pediatric and Adult Dosage: 1 mCi

Radiation Dosimetry: Critical organ dose (bladder): 30 mrem; Effective dose: ~10 mrem (from EANM guideline)

Route of Administration: Into the bladder via urethral catheter.

Patient Scheduling: Telephone scheduling requests should be directed to the scheduling desk. A negative urine culture within the week before the examination is recommended.

Patient Preparation: The procedure should be explained in detail. Verify urinalysis results to document that there is no evidence of urinary tract infection prior to catheterization.

Needed supplies: 1. Catheter tray
   2. 500 mL normal saline IV solution (+ 1 vial Neosporin GU irrigant if directed by physician)
   3. IV tubing (fits IV solution bag with a distal end appropriate for catheter connection).
   4. Foley catheter (or feeding tube) of correct size.
   5. Worksheet for data recording

Equipment Setup: Gamma Camera: LFOV camera
   Collimator: LEHR
   Energy Window: 140 keV with 20% window

Patient Positioning: Camera is positioned underneath patient for posterior imaging.
Nomogram for expected bladder volume (or check previous studies)

\[(\text{Age [yrs]} + 2) \times 30 \text{ mL} = \text{expected volume.}\]

**Procedure:** The computer is set up for continuous dynamic acquisition for 150 frames at 15 second per frame (128 x 128 word matrix).

Catheterize patient with standard, aseptic technique, and connect catheter to IV infusion set. Position the patient with the inferior edge of the bladder close to bottom of field of view. Begin saline flow and aseptically inject the radiopharmaceutical into the distal injection port of the IV infusion set. Begin dynamic computer acquisition.

Complete radionuclide cystogram worksheet and note volume of saline instilled at which any reflux occurs during bladder filling.

Image supine and place a bedpan or diaper under the patient. The study may be performed in the upright position by turning the camera to the upright position, and seating the patient on bedpan with back to camera. Deflate Foley balloon and remove catheter gently.

One minute after voiding is complete, stop the dynamic computer acquisition.

Display images using the “D” display after compressing the images to 1 minute frames (add 4 frames together). Label images.

<table>
<thead>
<tr>
<th>View</th>
<th>Image Display Parameters (Analog or Digital Images)</th>
<th>Digital Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Posterior during bladder filling</strong></td>
<td>15 seconds per frame</td>
<td></td>
</tr>
<tr>
<td>Compress by adding 4 frames before filming.</td>
<td>128 x 128 matrix, word mode</td>
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</tr>
<tr>
<td><strong>Posterior during voiding</strong></td>
<td>15 seconds per frame</td>
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**Items Required For Complete Study:**

1. Posterior dynamic computer acquisition during bladder filling and voiding

2. Film dynamic acquisitions

3. Complete Radionuclide cystogram worksheet