MECKEL'S DIVERTICULUM STUDY
5.5
Radiology Associates of Clearwater

Overview

The Meckel's Diverticulum Study depicts the uptake of pertechnetate within the abdomen. As a small molecule with a single negative charge, pertechnetate is secreted into the stomach as well as any ectopic gastric mucosa. Because pertechnetate exhibits weak protein binding, it is filtered by the kidneys.

Indications

Detection and localization of a Meckel's diverticulum containing functioning gastric mucosa (1,2).

Detection and localization of other pathologic structures containing gastric mucosa (3).

Examination Time

1 hour 15 minutes.

Patient Instructions / Scheduling

Patient must be NPO for a minimum of four hours prior to the study, preferably overnight. The test will be performed on an emergency basis when there is clinical evidence for active GI bleeding. Elective examination should be scheduled early in the morning after an overnight fast.

The schedule must be coordinated with Radiology and Endoscopy as the Meckel scan must be performed prior to the administration of any barium studies.

Lab /Image Correlation

No laboratory data is necessary, however, if recent hematocrit has been drawn, please obtain the results.

If available, any recent studies, such as upper GI, small bowel follow-through, or barium enema, should be obtained.

Patient Preparation
The patient must fast for a minimum of four hours, but overnight is preferable.

If an NG tube has been placed, this should be attached to low suction during the study.

Have the patient void immediately before the study.

Optional:
Administer cimetidine prior to injecting the radiopharmaceutical (4,5):
Give 300 mg intravenously 30 minutes prior to the study. (Dilute to 20 mL and infuse over 5 minutes.) (5).
Give 300 mg orally 60 minutes prior to the study (4).

Equipment & Energy Windows

Gamma camera: Large field of view.
Collimator: Low energy, high resolution, parallel hole.
Energy window: 20% window centered at 140 keV.
Matrix: 128x128.

Radiopharmaceutical, Dose, & Technique of Administration

Radiopharmaceutical: Tc-99m-pertechnetate as sodium pertechnetate.
Dose: 10 mCi (370MBq), IV (70 µCi/kg in children).
Technique of administration: Standard intravenous injection.

Patient Position & Imaging Field

Patient position: Supine
Imaging field: Abdomen and pelvis (must include right lower quadrant).

Acquisition Protocol

Flow imaging: following bolus injection of the radiopharmaceutical, acquire 16 five-second images.

Obtain 500,000 count images immediately, 5, 10, 15, 30, 45, and 60 minutes after injection. In addition, obtain posterior and right lateral views at 30 and 60 minutes.
If the study remains negative after 50 minutes, have the patient void and repeat the anterior, right lateral, and posterior views.

Check images to determine the need for additional views (upright, oblique, post voiding, etc.). Check with physician, if available.

**Data Processing**

None.

**Optional Maneuvers**

Other projections: R LAT, L LAT, LAO, and RAO images may be obtained to help localize activity in 3 dimensions (6).

Use of a nasogastric tube: A nasogastric tube may be inserted prior to the study and attached to suction to minimize the movement of radioactivity secreted by the stomach into small intestine (6,7).

Other drugs: Some have advocated giving pentagastrin approximately 15 minutes prior to injection of the radiopharmaceutical in an attempt to increase the secretion of pertechnetate by ectopic gastric mucosa (8,9).

**Principle Radiation Emission Data - Tc-99m (10)**

Physical half-life = 6.01 hours.

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Mean % per disintegration</th>
<th>Mean energy (keV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gamma-2</td>
<td>89.07</td>
<td>140.5</td>
</tr>
</tbody>
</table>

**Dosimetry - Tc-99m-Pertechnetate as Sodium Pertechnetate (11)**

<table>
<thead>
<tr>
<th>Organ</th>
<th>rads/5 mCi</th>
<th>mGy/185 MBq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroid</td>
<td>0.65</td>
<td>6.5</td>
</tr>
<tr>
<td>Large intestine</td>
<td>0.60</td>
<td>6.0</td>
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<tr>
<td>Bladder wall</td>
<td>0.43</td>
<td>4.3</td>
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<tr>
<td>Stomach</td>
<td>0.26</td>
<td>2.6</td>
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<tr>
<td>Ovaries</td>
<td>0.15</td>
<td>1.5</td>
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<tr>
<td>Whole body</td>
<td>0.06</td>
<td>0.6</td>
</tr>
<tr>
<td>Testes</td>
<td>0.05</td>
<td>0.5</td>
</tr>
<tr>
<td>Red marrow</td>
<td>0.01</td>
<td>0.1</td>
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**References**


Normal Findings


Note: This procedure adheres to the Society of Nuclear Medicine Guideline: Gastrointestinal Bleeding/Meckel's Diverticulum Scintigraphy 1.0, Approved

February 7, 1999.