PARATHYROID STUDY
Radiology Associates of Clearwater

Overview

The Parathyroid Study depicts hypertrophied parathyroid tissue, probably because of uptake of Tc-99m-sestamibi in the mitochondria of hyperactive cells.

Indications

Detect and localize parathyroid adenomas (1-3).

*Exams ordered for indications which are not listed above need to be discussed with the Nuclear Medicine Physician.

Examination Time

Initially: 60 minutes.

Delayed imaging at 2 hours: 20 minutes (1).

*Patients who are getting a pre-op injections will only require a single image at 15 minutes.

Patient Instructions

None

Lab / Image Correlation

Any imaging studies if the neck should be included for comparison.

Patient Preparation

None.

Equipment & Energy Windows

Gamma camera: Small or large field of view with 1.5 zoom (1).

Collimator: Low energy high resolution

Energy windows: 20% window centered at 140 keV.
Radiopharmaceutical, Dose, & Technique of Administration

Radiopharmaceutical: Tc-99m-sestamibi (1,4).

Dose: 25 mCi (925 MBq).

Technique of administration: Standard intravenous injection.

Patient Position & Imaging Field

Patient position: Supine with head and neck extended (1).

Imaging field: Neck and upper two thirds of the mediastinum.

Acquisition Protocol (1)

Acquire images of the neck and mediastinum for 300 seconds each as follows:

1. Immediate ant. w/mkr on SSN and 4 cm distance mkrs on right side of neck.
2. Ant. at 5 min.
3. RAO at 10 min. at 34º
4. LAO at 15 min. at 34º
5. Chest at 20 min. – salivary glands to diaphragm.
6. 90 min.-2 hr after injection, do planar images using 1,2,3,4 above.

*If this is a pre-op study only an anterior image is required. Do not Inject the radiotracer until called by Surgery to confirm the time of injection. After injection, document the time and date and send copies of the previous and current image with the patient to surgery.

If requested by the Nuclear Medicine Physician SPECT images may be performed (5,6). See the Parathyroid SPECT/CT protocol:

1. Degrees of rotation: 360
2. Number of images: 64
3. Time per image: 20 seconds

Show images to the physician prior to the patient leaving.

Data Processing

SPECT images will be processed on the appropriate workstation following the parathyroid protocol.
Principle Radiation Emission Data - Tc-99m (11)

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-Sestamibi (12)

<table>
<thead>
<tr>
<th>Organ</th>
<th>rads/25 mCi</th>
<th>mGy/925 MBq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper large intestine</td>
<td>3.88</td>
<td>38.8</td>
</tr>
<tr>
<td>Lower large intestine</td>
<td>2.68</td>
<td>26.8</td>
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<tr>
<td>Gallbladder wall</td>
<td>2.41</td>
<td>24.1</td>
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<tr>
<td>Small intestine</td>
<td>2.32</td>
<td>23.2</td>
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<tr>
<td>Kidneys</td>
<td>1.39</td>
<td>13.9</td>
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<tr>
<td>Urinary bladder wall</td>
<td>1.29</td>
<td>12.9</td>
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<tr>
<td>Ovaries</td>
<td>1.02</td>
<td>10.2</td>
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<tr>
<td>Thyroid</td>
<td>0.68</td>
<td>6.8</td>
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<tr>
<td>Red marrow</td>
<td>0.60</td>
<td>6.0</td>
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<tr>
<td>Whole body</td>
<td>0.38</td>
<td>3.8</td>
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<tr>
<td>Liver</td>
<td>0.36</td>
<td>3.6</td>
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<tr>
<td>Testes</td>
<td>0.24</td>
<td>2.4</td>
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</table>

References


Normal Findings

Note: This protocol is in agreement with the Society of Nuclear Medicine Procedure Guidelines Manual, 1999.