THYROID IMAGING STUDY  
(Tc-99m-Pertechnetate)  
Radiology Associates of Clearwater

Overview

The Thyroid Imaging Study with Tc-99m-pertechnetate demonstrates the distribution of tissues that take up anions. Such tissues include the thyroid, salivary glands, and stomach.

Indications

Evaluation of palpable nodules (1-3).

Evaluation of abnormal gland to palpation, but without definite nodules (4,5).

Evaluation of patients who had irradiation of the head and neck in childhood with or without palpable nodules (6,7).

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

Examination Time

1 hour.

Patient Instructions

Ask if the patient takes thyroid hormone, antithyroid drugs (such as PTU, Tapazole, Cytomel, or iodine), or kelp. These drugs should be held as follows: Synthroid, Cytomel and Proloid 4 weeks; PTU 3 days; Perchlorate 2 weeks; and Tapazole 7 days. Kelp (sea weed) should not have been ingested during the 4 weeks prior to the test.

Ask if there have been any recent x-ray, IVP, or CT studies, with administration of intravenous contrast or lumbar puncture, in the prior 4 weeks. These may interfere with imaging. (8)

If a radioiodine uptake (RAIU) has also been ordered, the thyroid scan will be done immediately following the uptake determination, requiring appointments on 2 days.

Tell the patient this will be a one-hour test, unless an uptake is also done.

Lab / Image Correlation
Have thyroid function test results available.

Have report and images form any previous thyroid ultrasound.

**Patient Preparation**

No patient preparation is required unless the patient has received the drugs or contrast media described above.

If a 24-hour RAIU done before scanning is 4% or less, perform anterior view only; if inadequate, check with the nuclear medicine physician before proceeding with the other views.

**Equipment & Energy Windows**

Gamma camera: Small or large field of view.

Collimator: Parallel (LEAP) and Pinhole with 5 mm insert (9).

Energy windows: 20% window centered at 140 keV.

**Radiopharmaceutical, Dose, & Technique of Administration**

Radiopharmaceutical: Tc-99m-pertechnetate as sodium pertechnetate (10,11).

Dose: 10 mCi (370 MBq).

Technique of administration: Standard intravenous injection.

**Patient Position & Imaging Field**

Patient position: Supine.

Imaging field: Neck.

**Acquisition Protocol**

Begin imaging 15 minutes after the IV administration of Pertechnetate.

Position the patient supine with the neck extended. Place a towel or pillow under the upper shoulders to achieve optimal neck extension and stability. Position the pin hole collimator so that the thyroid gland fills approximately two thirds of the field of view.
Obtain images from the anterior, 45 RAO, and 45° LAO projections. Accumulate 100,000 counts per image or 300 sec. Move the camera head, not the patient, for the oblique views.

Obtain an anterior marker view with a centimeter marker (same position as for study view). Obtain a second anterior image with a suprasternal notch marker in the center of the field, the entire thyroid in the upper part of the field, and a marker on the right side of the neck.

Obtain anterior view with high resolution parallel hole collimator for 100K/300 sec. over thyroid.

**Data Processing**

None.

**Principle Radiation Emission Data - Tc-99m** (20)

Physical half-life = 6.01 hours.

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

**Dosimetry - Tc-99m-Pertechnetate as Sodium Pertechnetate** (20)

<table>
<thead>
<tr>
<th>Organ</th>
<th>rads/5 mCi</th>
<th>mGy/185 MBq</th>
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<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>
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<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 protocol is in agreement with the Society of Nuclear Medicine Procedure Guidelines Manual, Feb 1999.