Austin Radiological Association
Nuclear Medicine Procedure

THYROID IMAGING STUDY
(Tc-99m as Sodium Pertechnetate)

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 hyperthyroidism.

• Evaluation of enlarged glands or glands with nodules.

• Evaluation of patients who had irradiation of the head and neck in childhood with or without palpable nodules.

• Evaluation of primary congenital hypothyroidism.

Examination Time

• 1 hour.

Patient Preparation

• The technologist records a pertinent, standard history on the Thyroid Information Sheet (see below).

Equipment & Energy Windows

• Gamma camera: Small or large field of view.

• Collimator: Pinhole with 5 mm aperture.

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

- Radiopharmaceutical: Tc-99m as sodium pertechnetate.
- Dose: 10 mCi (370 MBq). Pedi dose by NACG chart.
- Technique of administration: Standard intravenous injection.

Patient Position & Imaging Field

- Patient position: Supine.
- Imaging field: Neck with chin tilted up.

Acquisition Protocol

- Begin imaging 20 minutes following injection of the radiopharmaceutical.
- Acquire 10 minute Anterior, RAO, and LAO images of the thyroid with the collimator 3 inches from the patient’s neck.
- Have Radiologist review images for any history of nodules or mass

Protocol Summary Diagram

![Diagram showing action and time for Tc-99m-pertechnetate}

Data Processing

- None.
Optional Maneuvers

- Follow up I-123 study for functioning nodules: If 1 or 2 functioning nodules are identified, a repeat study with radioactive iodine should be performed since some thyroid cancers concentrate Tc-99m-pertechnetate, but not radioactive iodine.

- SPECT imaging: SPECT imaging of the thyroid may be performed.

Method for timely correction of Data Analysis and reporting errors and notification of referring parties

- Data Analysis and reporting errors are reported to the interpreting physician and appropriate clinic manager for timely correction and notification of the referring physician via report addendum or STAT call if error is significant.

Principle Radiation Emission Data - Tc-99m

- 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

<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>
</tr>
<tr>
<td>Bladder wall</td>
<td>0.43</td>
<td>4.3</td>
</tr>
<tr>
<td>Stomach</td>
<td>0.26</td>
<td>2.6</td>
</tr>
<tr>
<td>Ovaries</td>
<td>0.15</td>
<td>1.5</td>
</tr>
<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>
</tr>
<tr>
<td>NUCLEAR MEDICINE THYROID DATA SHEET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient MRN_______________________ Date____________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient __________________________________________________________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referring Physician ____________________________________________________________</td>
<td></td>
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<tr>
<td>Test Ordered ____________________________________________________________________</td>
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</tr>
</tbody>
</table>

___ Thyroid Medication ____________________________________________________________

___ Other Medications __________________________________________________________

___ RAI DX/RX (When & Where) __________________________________________________

___ Thyroidectomy ____________________________________________________________

___ Imaging in the last 30 days? Type of Exam(s) ________________________________
   Date of Exam(s) __________________________

___ Myelogram, CT with IV contrast, IVP, Arteriogram, Cardiac Cath? __________

___ Family history of Goiter or other thyroid problems? _________________________

___ Pregnant? ______ Nursing? ______ LMP? _________________________________

___ Recent female hormones? ________________________________________________

___ Lump or Goiter? (how long have you noticed?) _____________________________

___ Recent change? __________________________________________________________

___ Weight change? (how much, what time period?) ______________________________

___ Exophthalmus or pressure? (how much, how long?) __________________________

___ Pain in lower neck, sore throat, dysphagia? ________________________________

___ Other remarks: ___________________________________________________________