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 of Tc-99m-pertechnetate action and time]

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>
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</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>
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<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>
</tbody>
</table>
NUCLEAR MEDICINE THYROID DATA SHEET

Patient MRN_______________________ Date____________________________

Patient ____________________________________________________________

Referring Physician _________________________________________________

Test Ordered _________________________________________________________

_____ 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?) ______________________

_____ Exopthalmus or pressure? (how much, how long?) __________________

_____ Pain in lower neck, sore throat, dysphagia? _________________________

_____ Other remarks: ________________________________________________