



Austin Radiological Association
Nuclear Medicine Procedure
THYROID METASTASES STUDY
(I-123 as Sodium Iodide)

Overview

- The Thyroid Metastases Study with radioiodine demonstrates the distribution of functioning thyroid tissue, both residual normal tissue in the thyroid bed and functioning metastases. Small amounts of iodine accumulate in the salivary glands, nares, and stomach as well.

Indications

- Detection and localization of persistent or recurrent functioning thyroid cancer.

Examination Time

1. Initially: 15 minutes for radiopharmaceutical administration.
2. Imaging 24 hours later: 1 hour for whole body images.

Patient Preparation

- Technologist records a standard history on the Thyroid Information Sheet.
- Optional Thyrogen stimulation of potentially functioning thyroid tissue:
 - Inject .9 mg IM recombinant human thyrotropin on 2 consecutive days and administer the radiopharmaceutical on the third day.
- Withdraw thyroid replacement hormones and anti-thyroid medications:
 1. Thyroxine (T-4) for at least 4 weeks or until TSH >30
 2. Methimazole / Tapazole for 3-5 days.
- The patient must not have had intravenous or intrathecal iodinated contrast material (CT with contrast, IVP, myelogram, angiogram) for at least 4 weeks.
- The patient should be NPO for at least 1 hour after administration.
- Remove all items of clothing that may contain excreted radioactivity that may cause artifacts, e.g. handkerchiefs from pockets.
- The patient will drink a glass of water immediately prior to imaging. This helps clear any esophageal activity due to labeled saliva.

- Obtain Thyroglobulin level.
- If female of child bearing age obtain serum pregnancy labs within 7 days of administration in accordance with policy.
- A mild laxative, e.g. Bisacodyl, the day before imaging

Equipment & Energy Windows

- Gamma camera: Large field of view, preferably dual head.
- Collimators:
 - Low energy, parallel-hole collimator
- Energy window:
 - 20% window centered at 159 keV

Radiopharmaceutical, Dose, & Technique of Administration

- Radiopharmaceutical:
 - I-123 as sodium iodide.
- Dose:
 - 5 mCi (185 MBq). Pedi dose by NACG chart.
- Technique of administration: Oral.

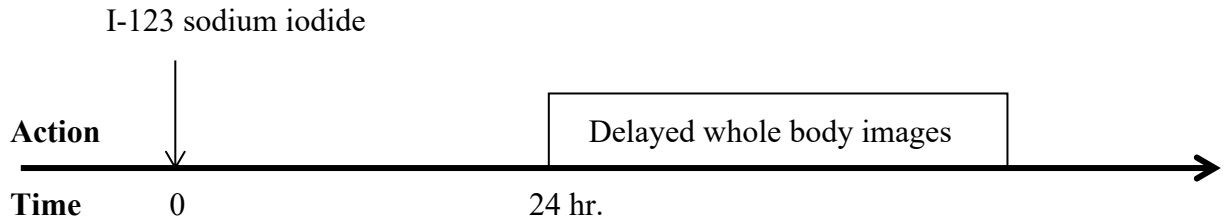
Patient Position & Imaging Field

- Patient position: Supine.
- Imaging field: Whole body to mid-thigh.

Acquisition Protocol

- Imaging time:
 - 24 hours.
- Acquire ANT static image of head and neck for 10 minutes.
- Acquire ANT and POST images of the head to mid-thighs using a whole body technique. Scan at 8 cm/min.
- Optional: Obtain SPECT/CT per radiologist's request.

Protocol Summary Diagram



Data Processing

- None, unless SPECT/CT utilized, then transverse, coronal, and sagittal reformats.

Optional Maneuvers

- Imaging following I-131 therapy: Whole body imaging may be performed 5-10 days following I-131 treatment for thyroid cancer.
- Whole body imaging with F-18-fluorodeoxyglucose: Useful for demonstrating undifferentiated metastases that are not well seen with I-123. The addition of pretreatment with recombinant TSH increases the detection rate of metastases.
- Whole body imaging with In-111-octreotide: Useful for demonstrating undifferentiated metastases that are not well seen with I-123.
- Medullary thyroid cancer: This cancer has been successfully imaged with F-18-fluorodeoxyglucose and In-111-octreotide.
- Hurthle cell thyroid cancer: This cancer has been successfully imaged with Tc-99m-sestamibi and F-18-fluorodeoxyglucose.

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 - I-123

- Physical half-life = 13.2 hours.

<u>Radiation</u>	<u>Mean % per disintegration</u>	<u>Mean energy (keV)</u>
Gamma-2	83.3	159.0
ce-K, gamma-2	13.6	127.2

Dosimetry - I-123 as Sodium Iodine

<u>Organ</u>	<u>rads/500 μCi</u>	<u>mGy/18.5 MBq</u>
Thyroid	3.75	37.5
Stomach wall	0.12	1.2
Ovaries	0.02	0.2
Red marrow	0.02	0.2
Liver	0.01	0.1
Whole body	0.01	0.1
Testes	0.01	0.1