

NUCLEAR MEDICINE SERVICES

SUBJECT: THYROID UPTAKE/ IMAGING STUDY (IODINE-123)

OVERVIEW:

The Thyroid Imaging Study with radioiodine demonstrates the distribution of functioning thyroid tissue, including ectopic tissue, since thyroid tissue is the only tissue that concentrates large amounts of iodine.

INDICATIONS:

- Evaluation of palpable nodules
- Evaluation of an abnormal gland to palpation, but without definite nodules.
- Evaluation of patients who had irritation of the head and neck in childhood with or without palpable nodules.
- Evaluation for ectopic thyroid tissue, e.g. struma ovary (image over pelvis) and lingual thyroid (image upper neck and jaw).

EXAMINATION TIME:

Initially 20 minutes for radiopharmaceutical administration.

****Pediatrics must be able to swallow pill****

****Liquid only if available and approved by Radiologist****

Delayed uptake measurement and images at 4-6 hours: 1 hour.

Delayed uptake measurement 24 hours: 30min.

PATIENT PREPARATION:

Must be on a low iodine diet for 3 days prior to the dose.

1. No multi-vitamins/minerals for 7 days prior to the dose.
2. No seaweed, kelp, shellfish or fish 3 weeks prior to the dose.
3. Resume normal diet 24 hours after dose.

Must be off thyroid hormones (1,4,5):

1. Thyroxine (T-4) (e.g. Synthroid) for at least 3 weeks.
2. Triiodothyronie (T-3) for at least 7 days.

Must not be taking anti-thyroid medications (1,4,5):

1. Propylthiouracil (PTU) and tapazole for at least 5 days.

Must not have had intravenous iodinated contrast (angiogram, IVP or CT) for at least 6 weeks or intrathecal iodinated contrast material (myelogram) for at least 3 months (1).

Other agents may interfere, but usually only to a small extent (1).

EQUIPMENT & ENERGY WINDOWS:

Gamma camera: Brightview Xct
 Collimator: Pinhole
 Energy windows: 20% window centered 159 keV.

RADIOPHARMACEUTICAL, DOSE, & TECHNIQUE OF ADMINISTRATION:

Radiopharmaceutical: I-123 as sodium iodine.
Dose: 200-300 uCi
Pediatric Dose: Based on weight 0.6 uCi/kg with a minimum of 0.25 uCi.
 (American College of Radiology(ACR)/Society for Pediatric Radiology (SPR), 2014 (Resolution 33))
Technique of administration: Oral

PATIENT POSITION & IMAGING FIELD:

Patient position: Supine.
 Imaging field: Neck.

ACQUISITION PROTOCOL:

Begin imaging 4-6 hours after ingestion of the radiopharmaceutical.

- 600 sec/Image-300sec/image for marker (Tc-99m source)
- Anterior, 30 degree LAO and RAO
- Anterior marker marking Right ramus of jaw bone ,Chin, Coracoid Cartilage, and Supper sternal notch. (Move Pin hole up so to include chin marker)

If there is palpable nodule, an additional anterior image should be acquired:

1. The nuclear medicine physician places a mark on the patient's skin directly over the center of the palpable nodule.

PROCESSING:

Display images with 4 and 24 hour uptakes labeled.

OPTIONAL MANEUVERS:

Evaluation for Ectopic Thyroid tissue:

1. If no Thyroid tissue is visible or low count acquired at 4-6 hours additional scanning is required.
2. Scan Chest (Include Thyroid bed), Abdomen and Pelvis 300 sec/image.
3. Show Radiologist exam before letting patient go.

Evaluation of midline activity: If the images show midline radioactivity, which may be due to radioactive saliva, have the patient swallow water and repeat the image.

Imaging of suppressed thyroid tissue with Tl-201

1. Perform at least 1 day after I-123 Study.
2. Inject 2-mCi thallous Tl-201 chlorides intravenously.
3. At 15 minutes, acquire a 10-minute anterior image of thyroid using a pinhole collimator.

Thyroid suppression test:

1. Performed to determine if a functioning nodule is autonomous.
2. Place the patient on 25 ug of triiodothyroxine four times a day for three days and repeat the thyroid imaging study.

Principle Radiation Emission Data –I-123

Physical half-life = 13.2 hours.

Radiation	Mean % per disintegration	Mean energy (keV)
Gamma- 2	83.3	159.0
Ce-K, gamma- 2	13.6	127.2

Dosimetry – I-123 as Sodium Iodine

Organ	rads/500 μ Ci	mGy/18.5 MBq
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

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Normal findings

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