



Austin Radiological Association
Nuclear Medicine Procedure
PARATHYROID STUDY
(Tc-99m-Sestamibi)

Overview

- The Parathyroid Study depicts hypertrophied parathyroid tissue, probably because of uptake of Tc-99m-sestamibi in the mitochondria of hyperactive cells.

Indications

- Detect and localize parathyroid adenomas.

Examination Time

- 120 minutes

Patient Preparation

- None, unless pediatric patient – then keep warm the day before and day of exam.

Equipment & Energy Windows

- Gamma camera: Small or large field of view.
- Collimator: Parallel-hole, high resolution.
- Energy windows: 20% window centered at 140 keV.
- Computer with SPECT software.

Radiopharmaceutical, Dose, & Technique of Administration

- Radiopharmaceutical: Tc-99m-sestamibi.
- Dose: 20 – 30 mCi (740 - 1110 MBq). Pedi dose by NACG chart.
- Technique of administration: Standard intravenous injection.

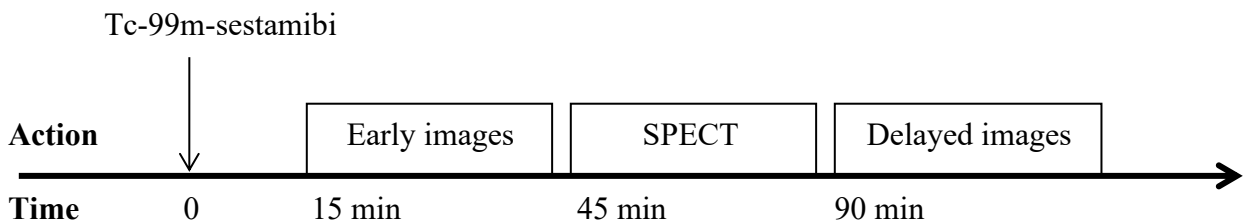
Patient Position & Imaging Field

- Patient position: Supine with head and neck extended and immobilized.
- Imaging field:
 1. Neck.
 2. Upper two thirds of the mediastinum.

Acquisition Protocol

- Single isotope, dual phase method:
 1. Acquire images at 15 minutes and 90 minutes post injection.
 2. Images at each time period:
 - a) Anterior, 30° RAO, 30° LAO
 - b) Acquire for 5 minutes each
- SPECT imaging:
 1. Degrees of rotation: 360°.
 2. Number of images: 60.
 3. Time per image: 40 seconds.
- The Tc-99m-sestamibi images should be correlated with an ultrasound study of the thyroid/parathyroid glands because thyroid adenomas can have the same tracer kinetics as parathyroid adenomas.

Protocol Summary Diagram



Data Processing

- SPECT processing – iterative reconstruction in coronal, sagittal, and axial planes.

Optional Maneuvers

- Intraoperative localization of parathyroid tissue: A gamma probe may be used at the time of surgery with injection only of Tc-99m-sestamibi 1 hour prior to surgery
- Parathyroid autografts: May be evaluated for hyperfunction with the same technique. Typically located in forearm.
- SPECT/CT for increased localization
- 4D CT for confirmation of adenoma
- FDG-PET for imaging parathyroid adenomas.

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.

Radiation	Mean % per disintegration	Mean energy (keV)
Gamma-2	89.07	140.5

Dosimetry - Tc-99m-Sestamibi

Organ	rads/25 mCi	mGy/925 MBq
Upper large intestine	3.88	38.8
Lower large intestine	2.68	26.8
Gallbladder wall	2.41	24.1
Small intestine	2.32	23.2
Kidneys	1.39	13.9
Urinary bladder wall	1.29	12.9
Ovaries	1.02	10.2
Thyroid	0.68	6.8
Red marrow	0.60	6.0
Whole body	0.38	3.8
Liver	0.36	3.6
Testes	0.24	2.4