

Parathyroid Scan

Updated

9/8/2024

- **Indications**

- To localize parathyroid adenomas or parathyroid hyperplasia in patients with primary hyperparathyroidism or for localization following disease recurrence.

- **Radiopharmaceutical:**

- 20-30 mCi Tc-99m sestamibi (Cardiolite) administered IV

- **Patient Preparation:**

- No specific preparation prior to radionuclide administration.

- **Conflicting Examinations/Medications:**

- No Nuclear Medicine exams within the previous 24 hrs.

- **Pregnancy/Lactation:**

- Pregnancy testing is only needed in potentially pregnant patients who state they could be pregnant. See Pregnant, Potentially Pregnant and Lactating Patients policy for specifics.
- Breast feeding mothers should discard breast milk for 4-24 hrs following Tc-99m sestamibi administration.

- **Imaging Technique:**

- Collimator - LEHR or LEAP
- Photopeak - 140 keV 20% window for Tc-99m
- Image Preset Counts
 - Static Images - 100k counts/image or 10 mins/image
 - SPECT Images - 60-120 stops, 15-25 secs/stop
- Matrix Size - 256 x 256 (static), 128 x 128 (SPECT)
- Zoom - 2.67
- Patient Positioning - supine

- **Dual-Phase (Routine) Protocol:**

- Static Images
 - Obtain anterior, 30° RAO and 30° LAO images of the neck and chest (to the bottom of the heart) at 15 mins and 3 hrs after radionuclide administration.
- SPECT Images (Only if Requested)
 - Obtain SPECT images of the neck and chest (to the bottom of the heart) after the 3 hrs static images are obtained.
 - Obtain axial, coronal and sagittal reconstructions and a 3D horizontal spinner.

- **Dual-Isotope Protocol:**

- First 8-12 mCi Tc-99m sodium pertechnetate is administered IV followed by anterior, 30° RAO and 30° LAO images of the neck and chest (to the bottom of the heart) at 30 mins after pertechnetate administration.
- Then 20-30 mCi Tc-99m sestamibi (Cardiolite) is administered IV followed by anterior, 30° RAO and 30° LAO images of the neck and chest (to the bottom of the heart) at 10 mins after sestamibi administration.
- Following frame normalization, the pertechnetate images are subtracted from the sestamibi images.
- Recent CT IV contrast administration will interfere with pertechnetate uptake by the thyroid gland.

- **Notes:**

- Primary hyperparathyroidism reflects increased secretion of PTH resulting in increased calcium and decreased phosphate levels.
- 80-90% of cases of primary hyperparathyroidism are caused by single adenomas, while 10-20% of cases are caused by multiple adenomas or gland hyperplasia. Approximately 1-3% of cases are caused by parathyroid carcinoma.
- Sestamibi localizes in both parathyroid and thyroid tissue but usually washes out from thyroid tissue more rapidly than from parathyroid tissue. Approximately 10-15% of adenomas washout as quickly as the thyroid.
- Hyperplastic parathyroid glands generally show faster washout than most adenomas and can be more difficult to detect.
- Pertechnetate is used for delineating the thyroid gland (pertechnetate is trapped by thyroid tissue but not by parathyroid tissue). This thyroid image is subtracted from sestamibi image and what remains is potentially a parathyroid adenoma.

➤ Thyroid lesions such as adenomas and carcinomas may be indistinguishable from parathyroid lesions.