



Austin Radiological Association
Nuclear Medicine Procedure
BONE MARROW STUDY
(Tc-99m-Sulfur Colloid)

Overview

- The Bone Marrow Study demonstrates the distribution of the intravascular mononuclear phagocyte system. The intravascular members of this system are cells that line the sinusoids of the liver (Kupffer cells), spleen, and bone marrow.

Indications

- Correlation with Tc-99m or In-111 labeled WBC studies

Examination Time

- 1 Hour

Patient Preparation

- None.
- Wait 72 hours after a Tc-99m WBC study.
- If performed after an In-111 WBC study, use 10% window at 140 keV

Equipment & Energy Windows

- Gamma camera: Large field of view, preferably dual head.
- Collimator: Low energy, high resolution, parallel hole.
- Energy window: 20% window centered at 140 keV.

Radiopharmaceutical, Dose, & Technique of Administration

- Radiopharmaceutical: Tc-99m-sulfur colloid.
- Use a fresh preparation of radiopharmaceutical, less than 2 hours old.
- Dose: 20 mCi (740 MBq). Pedi dose by NACG chart.
- Technique of administration: Standard intravenous injection.

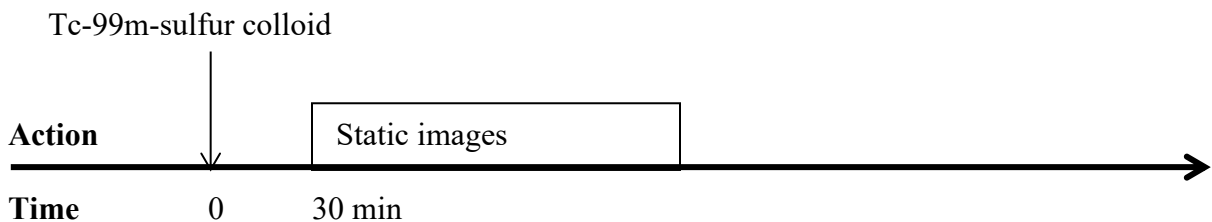
Patient Position & Imaging Field

- Patient position: Supine.
- Imaging field: Area of interest on WBC study

Acquisition Protocol

- Wait at least 30 minutes following injection of the radiopharmaceutical.
- Acquire 10 minute static images, in the appropriate projections to demonstrate the anatomy of concern.

Protocol Summary Diagram



Data Processing

- None.

Optional Maneuvers

- SPECT/CT imaging of the affected area:
 1. Image acquisition parameters:
 - a) Degrees of rotation: 360°.
 - b) Number of images: 60.
 - c) Time per image: 30 - 40 seconds.
 2. Data processing:
 - a) Reconstruct transverse, sagittal, and coronal images using iterative Flash 3D processing, and Gaussian filter.

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 hour.

| <u>Radiation</u> | <u>Mean % per disintegration</u> | <u>Mean energy (keV)</u> |
|------------------|----------------------------------|--------------------------|
| Gamma-2 | 89.07 | 140.5 |

Dosimetry - Tc-99m-Sulfur Colloid

RADIATION DOSE ESTIMATES FOR Tc-99m SULFUR COLLOID - NORMAL PATIENTS

| <u>Organ</u> | <u>Estimated Radiation Dose Equivalent (mSv/MBq)</u> | | | | | |
|---------------------------|--|-------------------|-------------------|--------------------|--------------------|--------------|
| | <u>Newborn</u> | <u>1-year Old</u> | <u>5-year Old</u> | <u>10-year Old</u> | <u>15-year Old</u> | <u>Adult</u> |
| Liver | 0.88 | 0.41 | 0.23 | 0.16 | 0.11 | 0.086 |
| Ovaries | 0.028 | 0.013 | 0.0068 | 0.0040 | 0.0022 | 0.0016 |
| Bone Surfaces | 0.065 | 0.029 | 0.014 | 0.0095 | 0.0066 | 0.0051 |
| Red Marrow | 0.10 | 0.036 | 0.019 | 0.011 | 0.0075 | 0.0068 |
| Spleen | 0.80 | 0.31 | 0.18 | 0.12 | 0.076 | 0.053 |
| Testes | 0.0072 | 0.0030 | 0.0013 | 0.00064 | 0.00032 | 0.00022 |
| Effective Dose Equivalent | 0.15 | 0.069 | 0.039 | 0.026 | 0.018 | 0.014 |