BONE MARROW STUDY
Radiology Associates of Clearwater

Overview

Functioning bone marrow consists of several cell lines which tend to be distributed in parallel. The Bone Marrow Study performed with radiocolloid demonstrates the distribution of functioning bone marrow within the skeleton by imaging one component of the bone marrow, the intravascular mononuclear phagocyte system.

Indications

Evaluation of regional bone marrow abnormalities in general (1-3).
Selection of bone marrow biopsy sites (4).

Diagnosis of osteomyelitis in conjunction with In-111-white blood cell (In-111-WBC) imaging (5-7).

Examination Time

1 hour.

Patient Preparation

None.

Equipment & Energy Windows

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

Radiopharmaceutical, Dose, & Technique of Administration

Radiopharmaceutical (8-10): Tc-99m-sulfur colloid.
Filtered with 0.22 micron millipore filter.
* Tc-99m-albumin colloid may be used.

Dose: 15 mCi (555 MBq).
10mCi filtered if used in conjunction with 111-In-WBC scanning.

Technique of administration: Standard intravenous injection.

Patient Position & Imaging Field
Patient position: Supine
Imaging field: Entire skeleton. Areas of interest for infection imaging.

**Acquisition Protocol**

Wait 15 minutes following injection of the radiopharmaceutical before imaging.

Imaging may be performed with either multiple spot images or whole body images. For spot images:
1. Image the head and torso in the ANT and POST projections; and the arms and legs in the ANT projection.
2. Acquire each image for approximately 2 minutes.

For whole body imaging:
1. Image the entire body in the ANT projection and the head and torso in the POST projection (Acquire spot images of the arms if necessary.).
2. Allot approximately 25 minutes to the ANT acquisition and 15 minutes to the POST acquisition.

**Data Processing**

None.

**Optional Maneuvers**

Bone marrow imaging may be performed in conjunction with In-111-WBC studies for osteomyelitis to increase the specificity of the test (5-7):
1. When the patient returns for In-111-WBC imaging, inject filtered 99m-Tc-SCOL and wait 15 minutes. Then acquire dual isotope images of the selected area.
   a) Acquire in 3 windows, 140KeV, 172KeV, 247Kev

Alternative radiopharmaceutical: Bone marrow imaging may be performed with In-111 chloride (11-13).

**Principle Radiation Emission Data - Tc-99m (14)**

Physical half-life = 6.01 hours.

<table>
<thead>
<tr>
<th>Radiation</th>
<th>Mean % per disintegration</th>
<th>Mean energy (keV)</th>
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<tbody>
<tr>
<td>Gamma-2</td>
<td>89.07</td>
<td>140.5</td>
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</table>
Dosimetry - Tc-99m-Sulfur Colloid (15)

<table>
<thead>
<tr>
<th>Organ</th>
<th>rads/15 mCi</th>
<th>mGy/555 MBq</th>
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<tbody>
<tr>
<td>Liver</td>
<td>5.08</td>
<td>50.8</td>
</tr>
<tr>
<td>Spleen</td>
<td>3.20</td>
<td>32.0</td>
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<tr>
<td>Bone marrow</td>
<td>0.43</td>
<td>4.3</td>
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<tr>
<td>Total body</td>
<td>0.28</td>
<td>2.8</td>
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<tr>
<td>Ovaries</td>
<td>0.08</td>
<td>0.8</td>
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<tr>
<td>Testes</td>
<td>0.003</td>
<td>0.03</td>
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References


Normal Findings

Last edited 6/1/2016

JSM