Hepatic Blood Pool Imaging

Primary Indications: Diagnosis of cavernous hemangioma of the liver.

Rationale: Increased blood-pool activity is seen in cavernous hemangiomas by comparison with normal hepatic parenchyma. Other hepatic mass lesions have blood-pool activity equal to or less than that of normal hepatic parenchyma.

Interfering Conditions: None

Precautions If in vitro labeling is performed then erythrocyte labeling patient verification must be performed. An ID bracelet must be placed on the patient and all blood samples must be labeled. The ID number on the radiolabeled blood to be reinjected and on the patient ID bracelet must match before any blood is reinjected.

Radiopharmaceutical: Tc-99m in vitro labeled red cells or Tc-99m modified in vivo (no centrifugation) labeled red cells; in vitro labeling is preferred.

Adult Dosage: 20 mCi (in vitro labeling)
25 mCi (modified in vivo labeling)

Pediatric Dosage: 280 µCi/kg with a minimum dose of 2.5 mCi (in vitro labeling); maximum dose of 20 mCi.
360 µCi/kg with a minimum dose of 2.5 mCi (modified in vivo labeling)

Radiation Dosimetry: In vitro labeling
Adult. Critical organ (heart): 1.7 rem. Effective dose: 0.6 rem.
Infant (1-year). Critical organ (heart): 1.1 rem. Effective dose: 0.5 rem.
Modified in vivo labeling
Adult. Critical organ (heart): 2.1 rem. Effective dose: 0.8 rem.
Infant (1-year). Critical organ (heart): 1.4 rem. Effective dose: 0.6 rem.

Route of Administration: Intravenous injection (bolus injection, if radionuclide angiography requested by physician)

Patient Preparation: None required

Equipment Setup: Gamma Camera: Dual headed SPECT preferred.
Collimator:
Planar imaging: LEAP or high-resolution collimator
Small children: converging collimator
SPECT imaging: High-resolution collimator
Energy Window: 140 keV with 20% window
**Patient Positioning**: Supine with 1-2 pillows under knees to minimize low back discomfort and to straighten lumbar lordosis. Check with physician for proper positioning of patient for radionuclide angiography (if requested).

**Procedure**: The routine examination consists of 1-hour delayed SPECT imaging only. At the discretion of the nuclear medicine physician, the examination may also include an initial radionuclide angiogram in the projection most likely to demonstrate the lesion (to be determined by physician based on CT, MRI, or sonographic findings) and early static images in several projections.

<table>
<thead>
<tr>
<th>View</th>
<th>Digital Acquisition</th>
<th>Film Display (If Applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTIONAL—Radionuclide angiogram and immediate static image</td>
<td>60 x 1-sec images (64 x 64 matrix, word-mode) followed by 2-min static image (256 x 256 matrix, word mode)</td>
<td>15 x 4-sec images followed by 2-min immediate static image</td>
</tr>
<tr>
<td>OPTIONAL—Early static views</td>
<td>256 x 256 matrix, word mode</td>
<td>Anterior view for 2-million counts or 300 seconds, which-ever is first. Right lateral, RPO, and posterior views for same time as anterior view.</td>
</tr>
</tbody>
</table>

**SPECT Acquisition**
- Specific acquisition protocol dependent on camera (1, 2 or 3 heads); see bench manual.
- No magnification.

**SPECT Reconstruction**
- Reconstruct entire volume
- No attenuation correction
- Ramp filter on acquisition computer
- 3D filter on DEC workstation

**Items Required For Complete Study:**

1. Films of OPTIONAL radionuclide angiogram and early static views (if obtained).
2. SPECT study: Reconstruction, filtering and volume rendering of digital data.
3. Transfer of all digital images to the workstation.
4. The SPECT images must be reviewed by a nuclear medicine physician before the patient leaves the department.