Austin Radiological Association

Nuclear Medicine Procedure

HEPATIC HEMANGIOMA STUDY
(Tc-99m-Red Blood Cells)

Overview

- The Hepatic Hemangioma Study depicts the amount of perfusion (early images) and vascular space (delayed images) within hepatic lesions. Hemangiomas are distinguished by their relatively decreased perfusion and increased vascular volume compared to hepatic parenchyma and most other hepatic lesions.

Indications

- Diagnosis of hepatic hemangioma 2 cm or larger. MRI preferred if < 2 cm.

Examination Time

- 2 hours.

Patient Preparation

- None.

Equipment & Energy Windows

- Camera: Rotating gamma camera.
- Collimator: Low energy, high resolution, parallel hole.
- Energy window: 20% window centered at 140 keV.
- Computer with SPECT software.

Radiopharmaceutical, Dose, & Technique of Administration

- Radiopharmaceutical: Tc-99m-red blood cells.
- Red blood cell labeling method:
    - In vivo method.
        Inject 2/3 to1 vial of reconstituted PYP (per Package Insert)
        Wait 30 minutes
        Inject Pertechnetate

- In vitro method.
  Use Ultratag kit – follow kit instructions

- Dose: 25 mCi (925 MBq). Pedi dose by NACG chart.

Patient Position & Imaging Field

- Patient position: Supine.

- Imaging field: Upper abdomen, to include entire liver.

Acquisition Protocol

- Acquire serial 3 second images for 90 seconds (30 frames) in the projection that brings the camera closest to the lesion (determined from previous imaging study, e.g. computed tomography or ultrasound study).

- Acquire delayed images for 500 K counts each at 5 (blood pool) and 45 minutes:

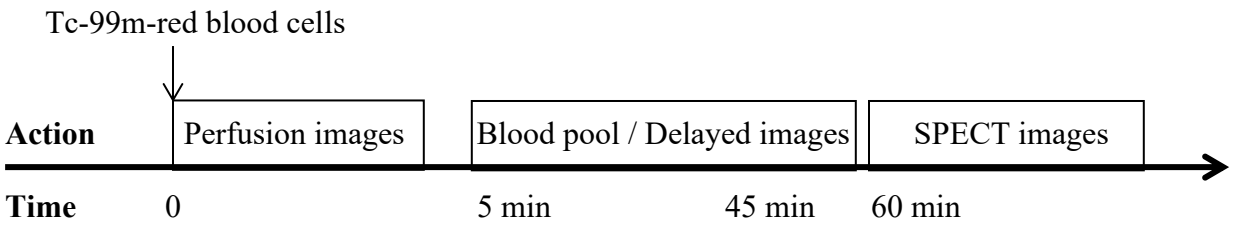
  1. At each time period acquire images in the ANT, R LAT, and POST projections. Additional projections may be acquired depending on the location of the lesion(s).

- SPECT imaging at 60 minutes following injection of the radiopharmaceutical:

  1. Image acquisition parameters:
     a) degrees of rotation: 360°.
     b) number of images: 60.
     c) time per image: 30 seconds.

- Show the study to the nuclear medicine physician who will determine if additional delayed images are needed.

Protocol Summary Diagram



Data Processing

- SPECT image reconstruction:

    1. The exact procedure for processing SPECT images depends on the computer software being used. This varies with the manufacturer and, in general, the manufacturer's protocol should be followed.

    2. The reconstruction process in general terms is:
        a) correct the 60 planar images for uniformity (camera non-uniformity) using a high count, e.g. 30 million count flood acquisition.
        b) check the images for patient motion and apply a motion correction algorithm if indicated and if available.
        c) if the entire field of view is not of interest, indicate the region that is of interest so that computer time is not expended reconstructing tomograms outside the region of interest.
        d) specify the filters to be used in the reconstruction process.
        e) reconstruct transverse, sagittal, and coronal image.

Optional Maneuvers

- Dynamic displays: SPECT images can be used to create tomographic cines in orthogonal projections or a maximum intensity projection display.

- CT co-registration: If the study is acquired with a SPECT-CT machine, the perfusion and blood volume images can be directly correlated with CT anatomy.

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-Labeled Red Blood Cells

Organ	rads/25 mCi	mGy/925 MBq
Heart	2.0	20.0
Liver	1.8	18.0
Spleen	1.5	15.0
Lungs	1.4	14.0
Kidneys	1.4	14.0
Blood	1.4	14.0
Red marrow	0.8	8.0
Whole body	0.4	4.0