

Blood-Brain Barrier Study (Brain Death)

Version History, Similar Studies & Variations

- V 1.1 - 02/10/04 – Altered for new acquisition information
- v 1.0 - 12/03/04 - Added Version History Information

Indications

- Determination of brain death.
- Preoperative surface localization of brain lesion.
- Detection of brain tumors, abscesses, and strokes when computed tomography and magnetic resonance imaging are not available.

Contraindications

- None

Equipment & Supplies

Camera with LEAP collimator
15 mCi Tc-99m-DTPA OR 20 mCi Tc-99m Ceretec

Preparation

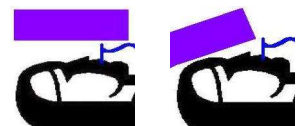
- If using Ceretec:
 - order 10 extra mCi and filter the radiopharmaceutical using pharmacy supplied 0.45 micron filter prior to going upstairs. This allows you to bolus the RP.
- A headband may be used to reduce external carotid perfusion to the scalp in patients without head trauma.

Administration

- Begin imaging prior to injecting the radiopharmaceutical.
- It is vital to inject the radiopharmaceutical as a tight bolus.
- If possible, attempt to inject on a right-sided vein.

Acquisition

- Acquire dynamic images for all blood-brain barrier scans
 - 1.5 sec/fr x 60 fr, 128x128x16 matrix. Repeat twice more, for a total of three scans.
- Perfusion images are obtained with an anterior projection.
- Positioning is vital to the success of this study.
- The patient's head should be immobilized in some manner to avoid reflexive motion.
- It is imperative to ensure that the whole skull, from the maxilla up, is in the field of view.
- The camera head should be as close as possible & orbital-meatal line perpendicular to the camera head.
- It is more important that the detector is close than perpendicular to the OML, as illustrated below.
- If performing Ceretec brain death images:
 - Wait 10 minutes post-injection before acquiring additional statics
 - Acquire 300 sec, 256x256x16 static ANT and at least one LAT image
- Delayed images are omitted for brain-death studies.
- Acquire delayed images 2 hours after injection for other types of blood-brain barrier scans.
 - ANT, POST, L LAT, R LAT, and VERT projections
 - 500k, 256x256x16
 - Acquire the VERT projection with a lead apron around the patient's neck to avoid visualizing the body.



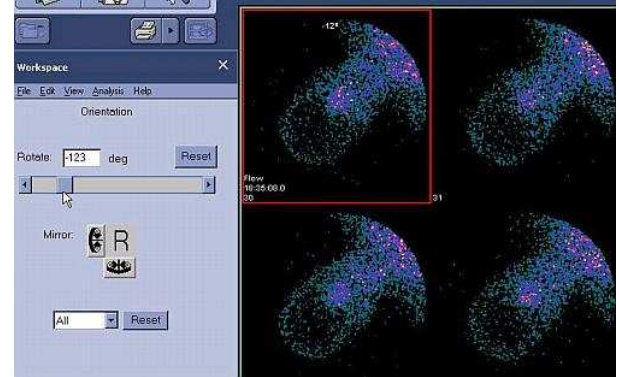
The above illustrations demonstrate positioning of a vent patient for a brain flow. The left image is incorrect, as the detector is farther away. The right image shows the detector closer to the patient, making a better image.

Required History

- History of trauma
- History of brain lesions
- History of tumors, abscesses, or strokes.
- Other clinical indications leading to the suspicion of brain death (BP spike, etc)

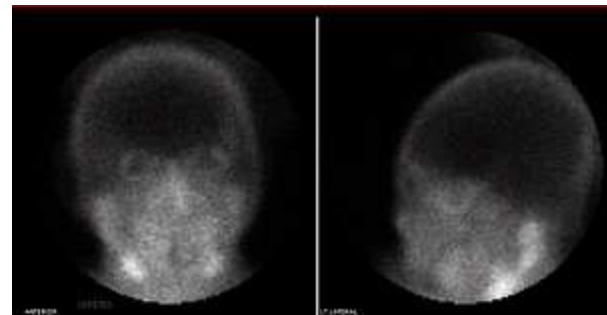
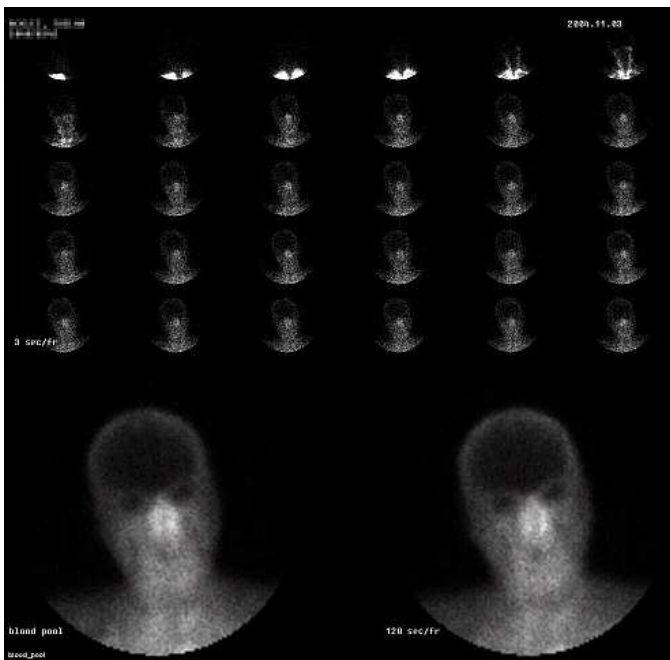
Processing

- Utilize **Patient Rename** to ensure the study is associated with an accession number.
- If the orientation is incorrect
 - Open the study in **Load to New**.
 - Click on **View -> Orientation**. Utilize the slider to rotate the image to the correct orientation.
 - Click **File -> Save Orientation**. Type in **RFLOW** and click **OK. Exit**.
 - Open the subfolder. It should contain two files. One is the original data (labeled **FLOW**) and the corrected orientation (labeled **RFLOW**). Delete the original data.
- Select the correct study and click on **Brain Flow** (All Applications->User Applications). Click **Start**.
- Select the number of frames you wish to compress by. To achieve 3 sec/fr, you will type **2** here.
 - Default to 3 sec/fr unless directed otherwise by the NM physician
- Click **OK**, then **Yes**.
- Take a screen capture of the resulting screen.
- Click **Save Results**, then **Exit**.
- NON-Xeleris processing is not addressed in this protocol.



Hand in Study

- Send the screen capture and initial flow dynamic to PACS.
- Send *mvhBrainFlow* results to the **Inbox** via **Brain Flow** (All Applications -> User Applications).



Ceretec “delay” ANT and LAT images

Standard brain flow display

