

GI BLEEDING SCAN
UPDATED: APRIL 2011

CPT CODE: 78728

Indications: This examination is performed in an attempt to identify the location of active gastrointestinal hemorrhage.

- Patients with active hemorrhage (bright red blood per rectum and transfusion requirements) are candidates for this examination on an emergency basis.
- Patients with melena are candidates for a more prolonged study with delayed imaging (see below).
- The study is not recommended as the initial test for upper GI bleeding studies (in this case, endoscopy is performed).
- In patients with portal hypertension and abdominal collaterals, the optional Tc-99m TcSC procedure is used.

Patient Prep: None.

Scheduling: Before scheduling patients for this study, a Nuclear Medicine staff or resident physician should be consulted as there are some times when the test is better modified. The best example is when there is evidence of recurrent bleeding with previous unsuccessful attempts at localization of bleeding site, then the study is started in the morning of a working day, continued out during the routine hours, and additional images obtained as appropriate.

Allow 30 minutes for the labeling process and 60 minutes for imaging; delayed imaging is possible. Schedule a 10 minute image the next morning, if the reader requests it.

Radiopharmaceutical

& Dose: Tc-99m Pertechnetate (TcO₄) 20 mCi +/- 20% (16-24 mCi) with UltraTag® RBC kit, adjusted for weight per nomogram or NMIS.
Assure patient they will be receiving their own blood by placing label marked with patient's name on labeling vial.

Preparation of Tc99m Labeled Red Blood Cells Using UltraTag® RBC

1. Collect 1-3 mL of the patient's blood using enough heparin 1000 units/mL to fill the needle hub as an anticoagulant.
2. Transfer the blood to the UltraTag® RBC reaction vial and gently mix to dissolve the lyophilized material. Allow to react for five minutes.
3. Add the contents of Syringe I and mix by gently inverting four to five times.
4. Add the contents of Syringe II and mix by gently inverting four to five times.
5. Place the vial in a lead shield and add the Tc99m pertechnetate. The Tc99m pertechnetate should be from a recent elution from a generator that has been previously eluted within the last 24 hours.
6. Mix by gently inverting reaction vial four to five times. Allow to react for 20 minutes with occasional mixing.
7. Re-inject the Tc99m-labeled red blood cells. They should be injected within 30 minutes of preparation, or as soon as possible thereafter. Mix gently prior to the withdrawal of the patient dose. Aseptically transfer the entire contents of the vial to a syringe for administration to the patient. Use largest bore needle compatible with patient administration to prevent hemolysis.
8. Typical labeling efficiency is greater than 95%.

Patients with Abdominal Collaterals: In patients with established cirrhosis and abdominal collaterals, the labeled RBC method is inappropriate, because it will be difficult to identify the GI bleeding site.

- Sulfur colloid 10 mCi +/- 20% (8-12 mCi) should be prepared as four separate 2.5 mCi doses each to be injected slowly IV with continuous imaging during injection and for 10 minutes after each injection.
- Dose will be adjusted for patient weight per nomogram or NMIS.
- The injection site should be as far from the abdomen as possible.
- This procedure will allow 4 opportunities for identifying GI bleeding.

Imaging Device:

Gamma camera with LEHR collimator, preferably largest field of view camera to include the entire abdomen.

Imaging Procedure:

Use predefined study (a dynamic of 10-second images acquired for one hour), plus additional images at longer intervals (at discretion of NM physician), and the next morning.

If stomach is visualized, image neck to document-free Pertechetate in the thyroid gland, and image and inspect gastric aspirate if a nasogastric tube is in place.

If the scan is abnormal and the physician is coming/called to review, keep acquiring a new set of images in 10-second/frame format until told to discontinue imaging.

Alternative Procedure with Tc-99m SC: Begin imaging immediately on injection of the radiopharmaceutical, obtaining 1-minute images for 10 minutes. Cranial tilt of the gamma camera may be required to better view the infrahepatic region. If no bleeding is identified then, then repeat injections of the divided radiopharmaceutical can be administered (up to 4 separate injections).

Display:

The display format will be 5-minute images for the period of the study.

Alternative Procedure: The images can be displayed in 2-min frames (up to total of 16 frames) for 4 injections, but the intensity should be changed to demonstrate background abdomen activity best.

Note: Bone marrow activity should be seen in every image.

PACS:

Send cine from the (60) 1-minute images, the save screen from the (12) 5-minute images, and the 10-second images.

Interpretation:

The study establishes the presence of GI bleeding during the period from tracer injection to imaging. This is a very sensitive test and can detect bleeding sites of 0.2-0.5 ml/min. However, because of the frequent retrograde and/or anterograde passage of tracer the bleeding site may not be accurately localized unless 10 second or 1 minute images are viewed in cine format. Once GI bleeding is confirmed, the study must continue until the site is localized. Once the site is seen, enough time must be allowed to see the passage of tracer and identify whether of small or large bowel origin. The literature also establishes that if a focus of tracer in the bowel is found then its intensity (<, equal to, > liver) is an indication of the blood transfusion requirements and the need of endoscopy and/or operative intervention (when > liver).

Alternative Procedure: Abnormal scans are characterized by activity foci away from the liver, spleen and bone marrow. This technique actually detects lesser bleeding rates (0.1 -0.2 ml/min) but because the circulating tracer is present for shorter time periods (half plasma disappearance time of radiopharmaceutical is 2 ½ minutes), the sensitivity for bleeding detection is less than the labeled RBC method.

Comments:

A Nuclear Medicine staff or resident physician should be consulted to determine if additional views are indicated.

Reviewed By: S. Perlman, D. Fuerbringer, S. Knishka

Scott B. Perlman, MD, MS
Chief, Nuclear Medicine

Derek Fuerbringer, CNMT
Manager, Nuclear Medicine

Scott Knishka, RPh, BCNP
Radiopharmacist