

GI BLEEDING SCAN
UPDATED: JANUARY 2018

CPT CODE: 78728

Indications:	<p>This examination is performed in an attempt to identify the location of active gastrointestinal hemorrhage.</p> <ul style="list-style-type: none">▪ 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:	<p>None.</p>
Scheduling:	<p>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.</p> <p>Allow 30 minutes for the labeling process and 60 minutes for imaging; delayed imaging is possible. Schedule a 20 minute dynamic image the next morning, if the reader requests it.</p>
Radiopharmaceutical & Dose:	<p>Tc-99m Pertechnetate (TcO₄) 20 mCi +/- 20% (16-24 mCi) with UltraTag® RBC kit, adjusted for weight per nomogram or NMIS.</p> <p>Assure patient they will be receiving their own blood by placing label marked with patient's name on labeling vial.</p> <p>The blood draw, labeling and ideally the patient will stay in the one room and no other patient or patient's blood will be allowed into the room until the labeling procedure and reinjection is complete. This will insure no chance of mixing up two different patients' blood.</p> <p>Preparation of Tc99m Labeled Red Blood Cells Using UltraTag® RBC</p> <ol style="list-style-type: none">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%. <p>Patients with Abdominal Collaterals: See next page</p>

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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:

Any Gamma camera with LEHR collimator, preferably a large field of view camera to include the entire abdomen from the base of heart to bladder.

Imaging Procedure:

Use the predefined protocol under UW Gastrointestinal and GI Bleed. A dynamic study will be acquired using 10 seconds per frame with a 128x128 matrix for three separate datasets of 20 minutes.

Additional images at longer intervals (at discretion of NM physician) may be acquired.

Lateral view is to be obtained at the end of dynamic imaging series to differentiate bladder activity. Acquire the lateral view for 3 minutes with a 128x128 matrix.

Delayed images may be performed the next morning.

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

If the scan is abnormal and the physician is coming or has been 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 with a 128x128 matrix 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).

Image reframe and Display:

1. The three 20 minute raw datasets should be reframed into 1 minute per frame.
 - a. Label first image set Ant 0-20 min 1 min/frame - send to PACS for immediate review
 - b. Label second image set Ant 21-40 min 1 min/frame - send to PACS for immediate review
 - c. Label third image set Ant 41-60 min 1 min/frame - send to PACS for immediate review
 - d. Repeat for all subsequent dynamic image sets
2. Make 3 separate save screens of the 1 min/frame reframed images, 20 on 1 4 rows of 5 images.
 - a. Label save screen Ant 0-20 min 1 min/frame
 - b. Label save screen Ant 22-40 min 1 min/frame
 - c. Label save screen Ant 41-60 min 1 min/frame
3. Add reframed images together to make a 0-60 min dynamic (1min/frame)
 - a. Label image set Ant 0-60 min 1 min/frame. Do not make a save screen of this image set.
4. Make a save screen of lateral image

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.

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PACS:

1. Send all raw data 10 second dynamic image sets and label them
 - a. Ant 0-20 Min 10 sec/frame
 - b. Ant 21-40 min 10 sec/frame
 - c. Ant 41-60 min 10 sec/frame
2. Send the reframed 0-60 min 1-min/frame dynamic.
3. Send the three 1 min/frame save screens from the 0-20 minute images, 21-40 min and 41-60 min.
4. When the study is complete delete in PACS each reframed 20 minute image sets. The only reframed dynamic set left should be the 0-60 minutes set.

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.

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