GALLIUM IMAGING
7.1.1
Radiology Associates of Clearwater

INDICATIONS:

1. Fever of unknown origin (FUO).
2. Suspected chronic infection, source unknown.
3. Inflammatory disease, usually autoimmune, such as sarcoidosis.
5. Postoperative fever, pain.
6. Osteomyelitis, chronic (always bone scan first).
7. Lymphoma (initial staging, response to therapy, evaluation of recurrence), only as second alternative to PET FDG.

*Exams ordered for indications which are not listed above need to be discussed with the Nuclear Medicine Physician.

SCHEDULING:

1. Notify outpatients that they will receive only an injection on their first visit, with images being made 2 and possibly 3 days later. All gallium lungs will be imaged at 2 days. All inpatient studies will begin at 24 hours. All outpatients (except lung studies) should return in 3 days. Inpatients suspected of having an infection may also have images made on the day after the injection.

2. Imaging sessions are approximately 90-120 minutes.

3. No Gadolinium (MRI contrast) for 24 hours prior to injection.

RADIOPHARMACEUTICAL:

Ga-67 Citrate, 5 mCi, IV for routine imaging.
Ga-67 Citrate, 10 mCi, IV for staging of lymphoma or other known malignancies.

PATIENT PREPARATION:
Ask the nuclear medicine physician or nurse if a laxative is to be given. Give one of these to the patient after injection of gallium, with instructions for use prior to imaging (Fleet - oral bowel prep - prior to imaging):

1. Fleet - oral bowel prep - (see directions on package).

2. **Milk of Magnesia**: Take two tablespoons approximately 2 hr after dinner the evening before examination, (ie, dinner at 6 pm, Milk of Magnesia at 8 pm).

3. Fleets Phospho-Soda - 1 bottle (8 oz.): Drink entire contents the night before imaging.

   * **Do not give magnesium citrate to patients with renal failure.**

4. The goal of laxative administration for this test is to clear free tracer from the GI tract. It is not necessary for the patient to be NPO.

5. Ask about recent chemo, XRT, blood transfusions.

**EQUIPMENT AND PREPARATION:**

Gamma Camera:

1. Dual head camera preferred.

2. Medium energy collimator.

3. Window setting:
   
   a. Channel 1: 20% window centered around 93 keV
   b. Channel 2: 15% window centered around 184 keV
   c. Channel 3: 15% window centered around 296 keV

**PROCEDURE:**

1. Administer the dose intravenously. Imaging for inflammation or infection will usually be at 72 hours after injection, with delayed views if needed. Imaging for lymphoma or other malignancy will usually be at 72 hours, also. Quant lungs will be at 48 hrs.
2. Whole body imaging: For lymphoma - whole body to below knee. Unless otherwise requested (i.e., Lung Quant, etc.), obtain anterior and posterior whole body images on all patients. If the field is not wide enough to include both arms, adjust anterior and posterior passes to include one arm on each. Whole body imaging may also be done with individual 8 minute static survey images. Acquire images from head through mid thigh, unless otherwise required.

3. Spot images: Arms over head and head hyperextended. Static views from various projections may be requested by the Nuclear Medicine physician for localization of abnormalities detected on survey imaging. Acquire each spot image for 8 minutes.

4. SPECT Images: refer to parameters at end of protocol. Always acquire SPECT of chest, abdomen, and pelvis for lymphoma.

NOTES AND PRECAUTIONS:

1. Combined Gallium/Technetium Sulfur Colloid liver imaging may be requested for the evaluation of hepatic lesions. With the Nuclear Medicine physician, determine the projection that best delineates the hepatic lesion being evaluated. Acquire a 5 minute image on computer. Reset the pulse-height analyzer to the 140 keV Tc-99m peak (20% window), and acquire a 5 minute image. Without moving the patient, inject 2 mCi Technetium 99m Sulfur Colloid intravenously and obtain a 5 minute image. Complete the study by obtaining Technetium 99m spot images of the liver from the same projections used for any other Gallium spot images.

2. When AIDS patients are referred for gallium imaging to rule out Pneumocystis carinii pneumonia, perform a standard whole body scan at 48 hours. Position scanner so that one stop contains entire lungs. Quantitation is not required.

COMPUTER PROCESSING:

1. For SPECT study 128 x 128 matrix.

2. Combined Ga/TcSC liver images: Correct the TcSC image for Ga-67 crosstalk by subtracting the Ga image made with the Tc-99m
window. Choose a homogeneous region of interest over the liver on the initial gallium image (Ga-67 windows) and the crosstalk-corrected TcSC image.

Calculate a normalization factor = \frac{\text{counts in Ga ROI}}{\text{counts in Tc ROI}}

Multiply the crosstalk-corrected TcSC image by the normalization factor. Subtract this normalized image from the initial gallium image; obtain a hard copy of this final image.

REFERENCES:

