GUNDERSEN HEATLH SYSTEM
NUCLEAR MEDICINE DEPARTMENT
PROTOCOL MANUAL

PROCEDURE: **SKELETAL IMAGING**

SECTION: **SKELETAL 9.1**

ORIGINAL DATE: **12 - 20 - 01**

DATE REVISED: **10 – 20 – 20**

REVIEWED: **ANNUAL**

Indications	Detection of bone metastases Diagnosis of osteomyelitis Evaluation of musculoskeletal trauma Evaluation of primary benign and malignant bone lesions Diagnosis of Complex Regional Pain Syndrome Evaluation of the response of Paget's disease to treatment. Evaluate/age/determine site of compression fractures prior to Kyphoplasty* Lincoln, etc. has requested BLOODPOOL and SPECT for this indication *** All children <10years old should have a Whole Body exam.
Indications – FLOW	Infection, stress fracture, avascular necrosis, primary bone tumor, CRPS or occult process; Blood pool only for kyphoplasty.
Contraindications	Patient should not have any Barium – 2 days before exam. Patient's with a history of recent intravenous/oral contrast administration should have their case reviewed with the Radiologist.
Exam time length	Initially: 15 minutes for injection of the radiopharmaceutical; 25 minutes for perfusion and blood pool parts of three-phase study. Delay 2-3 hours later: 1 hour for image acquisition.
Patient Preparation	Have the patient drink 2 - 4 glasses (8oz.) of water between the injection and scan times. Pt may void as needed. Void before imaging Remove all heavy metal from imaging area of interest Remove all metal for SPECT/CT imaging
Radiopharmaceutical & Dose	Radiopharmaceutical: Tc-99m-methylene diphosphonate (MDP). Dose: Adult: 20 mCi 99m-Tc MDP (Methylene diphosphonate) 25 mCi 99m-Tc MDP for SPECT /extremities 20 mCi 99m-Tc MDP for Pt > 100kg Pediatric: 0.25 mCi/kg (Dosing Range 1 – 18.3 mCi) for Whole body Pediatric: 0.31 mCi/kg (Dosing Range 1.25 – 22.8 mCi) for SPECT/extremities
Administration Technique	Technique of administration: Routine study: Standard intravenous injection. Three phase study: Oldendorf method.

Flow Bone **Acquisition parameters**	Flow
Time interval between tracer injection and imaging	immediate
Camera/Collimator	LEHR
Patient position	Supine Upright as needed
Energy	140 Kev
Matrix	128 x 128
Start Position	NA
End Position	NA
Time per Stop/View	10sec/view
Images taken	Flow of area of interest Static blood pool images; 256 matrix; 240 sec.
Send to Fuji	All screen caps
Send to Dr. PET	none

Ltd Bone **Acquisition Parameters**	Ltd Bone
Time interval between tracer injection and imaging	2-3 hrs
Camera/Collimator	LEHR
Patient position	Supine Upright as needed
Energy	140 Kev
Matrix	256 x 256
Scan Mode	Continuous
Start Position	NA for spot view– as needed for scan acquisition
End Position	NA for spot view– as needed for scan acquisition
Time per Stop/View	For Pt > 100kg, Select “WB over 100Kg” acquisition protocol on both systems. Optima 1 + 2: 300 sec exposure per pixel, 10 cm/min; Infinia 4: 240 sec exposure per pixel, 8 cm/min - For static images only, use acquisition time of 240 sec/image, with minimum of 240sec.
Images taken	As appropriate to study
Send to Fuji	All screen caps
Send to Dr. PET	none

Acquisition Parameters **Whole Body Bone**	Whole Body Bone
Time interval between tracer injection and imaging	2-3 Hours
Camera/Collimator	LEHR
Patient position	Supine
Energy	140 KeV
Matrix	1024*256 (wb) 256 (static's)
Scan Mode	Continuous
Start Position	Just above top of Head
End Position	Just below bottom of Feet
Time per Stop/View	For Pt > 100kg, Select "WB over 100Kg" acquisition protocol on both systems. Optima 1 + 2: 240 sec exposure per pixel, 10 cm/min; Infinia 4: 240 sec exposure per pixel, 8 cm/min - For static images only, use acquisition time of 240 sec/image, with minimum of 240sec.
Images taken	WB head to toe, lateral skull statics (5 min; 256 matrix)
Send to Fuji	Screen cap
Send to Dr. Pet	none

Acquisition – Bone SPECT	Bone SPECT
Time interval between tracer injection and imaging	2-3 hrs
Camera/Collimator	GE Infinia Hi Res *see acquisition notes below
Patient position	Supine
Energy	140kev
Matrix	128 x 128
Number of projections	60
Orbit CW or CCW	CW or CCW
Orbit type	Circular
Start Angle	0 or as computer determines
End Angle	360 from start
Time per view	Abdomen or chest; Optima 1 & 2 20 sec/frame; Infinia 4 25 sec/frame
Uniformity and COR	Daily/weekly
Prefilter Type	Hanning– adjust if requested by radiologist
Filter cutoff/power	0.9
Motion correction	Repeat if motion
Attenuation correction	CT
Name of program used	MI Evolutions for Bone
Send to Fuji	CT, MIP, Trans Emission; Trans Fused.
Send to Dr. PET	Entire study

<u>Data Acquisition</u>- Bone SPECT

When performing a SPECT acquisition where the pallet is NOT supported by the rollers in the gantry, the system applies a "table sag" correction to the data. In this scenario, we can use the body part "head or neck". If the pallet is advanced far enough during the acquisition set-up where it is supported by the rollers, then use "other" for body part.

To change, as needed, per above:

Under SPECT/CT acquisition Tomo Key Parameters, click "More Parameters".

Click on "Tomo Admin Parameters",

Under "Image Orientation: Change 'Body Part" needed by clicking on the drop down.

Data Processing – Flow

1.Highlight patient name and make sure all data sets are there;
2.Select and highlight the data sets you need and select "load to new" or use "Bone Flow" program.
3.Arrange flow images on top half; 16 images
4.Arrange blood pool images under flow images
5.Label all images for RT, LT, view and time/frame (flow)
6.Select Linear color map
7.. Adjust intensities
8.Screen capture as inverted image, exit page.
9.Send screen capture to Fuji

Data Processing – WB Bone (Insert note below for processing)

1. Adjust intensities for each image.
2. Screen capture as inverted image, exit page.
3. Send screen capture, WB images and static's to Fuji.

Data Processing – Ltd Bone
(See note below for acquired images)

1. Highlight patient name and make sure all data sets are there;
2. Select and highlight the data sets you need and select "load to new"
3. Arrange images in order you desire using screen format
4. Label all data for RT, LT, and view
5. Select Linear color map
6. Adjust intensities
7. Screen capture as inverted image, exit page.
8. Send screen capture to Fuji

Data Processing- LTD and WB

- Run acquired pictures through the "**Reduced Time LTD/WB Bone**".
- Once the images come up, you can select **File** -> **Save and Exit**.
- Select the patient dataset and select "**HalfWBBone**" which is located under the Favorite Applications (under the Gastric Emptying program) or you can find it under All Applications, under the User Application (on the top)
- Type in the dose information

Data Processing- Bone SPECT/CT

See General SOP- Xeleris SPECT/CT for processing.