

Division of Nuclear Medicine Procedure / Protocol University Hospital and The American Center

Bone Scan SPECT
UPDATED: November 2019

CPT CODE: 78320

Indications: This examination is done to “SPECT” particularly sites where planar imaging might be normal but the patient has a lesion.

The classical situations are:

- Spondylolysis
- AVN of hip
- Temporomandibular joint disease
- Patellar disease or other knee derangements
- Spotting planar lesions seen (especially discitis and also to identify which part of a vertebrae is involved)
- Vertebral metastasis

Patient Prep:

For adult patients ages 12 and over, no preparation prior to injection is needed; however, patient should be instructed after injection to drink four 8-ounce glasses of liquid and void frequently before returning for the scan. Patient should be asked to urinate immediately before imaging. Patient should be asked to drink plenty of fluids for at least 24 hours after radiopharmaceutical administration.

Pediatric patients less than 12 years of age:

- Follow the same patient preparation as adults
- IV placement is needed at time of injection (schedule with Pediatric Day Treatment)
- A Foley catheter with collection bag should be in place at time of scan for sedated and non-toilet trained children

Scheduling:

Allow 15 minutes for time of injection and allow 90 minutes for imaging. Imaging should be scheduled at least 3 hours post-injection.

Note: Allow 90 minutes for imaging with Pediatric Sedation and 120 minutes for general anesthesia cases for small children.

Radiopharmaceutical & Dispensed Dose:

99mTc-MDP (99mTc-HDP can be substituted if requested)

Half Dose (standard, actual reduction is 40% lower than full dose)

- Pediatric (>40kg) and Adult
 - Prescribed dose 15.0 mCi +/- 20% and weight based per nomogram/NMIS

Pediatric ≤ 40kg

- Prescribed dose formula is 0.25 mCi/kg +/- 20%; a minimum of 1.0 mCi.
- Children over 40kg see adult half dose above, 0.25 mCi/kg produces a higher dose than desired or needed when greater than 40 kg.

Full Dose Adult (when with dual isotope study)

- Prescribed dose is 25.0 mCi +/- 20% and weight based per nomogram/NMIS.

Imaging Device:

GE Infinia Hawkeye 1, 2, 3 or GE Optima 640 with LEHR collimators.

Acquisition Parameters:

For GE Infinia Hawkeye cameras go to **USER**, select **Bone Folder**, and select the **Evolution Bone SPECT** protocol (or **Evolution Bone HWK** if physician would like a CT in addition with the bone SPECT).

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<i>Infinia Hawkeye 1, 2, 3, and Optima</i>	Bone SPECT All cameras	Bone SPECT/CT All Infinia cameras	Bone SPECT/CT Optima
<i>Tomo Key Parameters</i>			
Mode	H	H	H
Start Angle	0	0	0
Patient Location	Feet First Supine	Feet First Supine	Feet First Supine
Use Body Contour	Yes	Yes	Yes
Acquire CT/AC	No	Check	Check
Select		Table Out	Table Out
Select		Emission First	Emission First
CT/AC Range		Full	Full
Select On		Emission	Emission
Zoom	1.0	1.0	1.0
Matrix	128x128	128x128	128x128
Pan Y	0	0	0
Select	Step and Shoot	Step and Shoot	Step and Shoot
Seconds	20	20	20
<i>Tomo Corrections</i>			
Energy Session	Tc99m	Tc99m	Tc99m
Selected Collimator	LEHR	LEHR	LEHR
COR Correction	Check	Check	Check
<i>Tomo CT/AC Parameters</i>			
Select		Helical	Helical
Pitch		1.9	1.5
Voltage		140.0	120.0
Current		2.5	2.0
Velocity		2.6	Rotation = 1 sec
Matrix		512x512	N/A
Filter		Bone	N/A
Extended FOV		Check	Check
<i>Tomo Location Parameters</i>			
Mode	H	H	H
Start Angle	0	0	0
Patient Location	Feet First Supine	Feet First Supine	Feet First Supine
Use Body Contour	Yes	Yes	Yes
Detectors 1 and 2	Check	Check	Check
Total Angular Range	360	360	360
View Angle	3	3	3
Direction	CW	CW	CW
Number of FOVs	1	1	1
FOV Time Multiplier	1.0	1.0	1.0
Rough Overlap	4	4	4
Direction	Table In	Table In	Table In
Select	Default	Default	Default
Motorized Pallet Support	Check		
<i>Tomo Admin Parameters</i>			
Auto Apply	Yes	Yes	Yes

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Release at End of Scan	Check	Check	Check
NM	None	None	None
CT/AC		None	None
FOV		None	None
Body Part	Chest	Chest	Chest
Acquisition Context	Unknown	Unknown	Unknown
Body Side	Other	Other	Other

Imaging Procedure:

1. A nuclear medicine technologist will verify the patient with 2 forms of identification (i.e. DOB, spelling the name, MR #). A brief description of the test will be explained to the patient.
2. The radiopharmaceutical can be directly injected into a vein using proper technique and flush well.
3. The patient will be instructed to return to the Radiology department at his/her scheduled imaging time.
4. When patient returns to the nuclear medicine department, he/she will first be instructed to use the bathroom to empty the bladder.
5. The nuclear medicine technologist will verify 2 forms of identification with the patient and instruct the patient to remove all large metal objects from pockets or body.
6. The patient will be instructed to lay supine on the imaging table with arms out of the way of the area of interest. An arm strap will be used to help hold the arms in place during the scan (if needed). A cushion may be placed underneath the patient's knees for additional comfort. Area of interest should be positioned within the Hawkeye limits of the table. The table extender may be used if necessary.
7. Position area of interest between the collimators.
8. Check images with a nuclear medicine staff or resident physician to see if any additional imaging is indicated prior to letting the patient leave.

Image Processing & PACS:

1. Select the tomo images of the **patient** and click on **Volumetrix MI Evolution for Bone** (for Infinia 2, 3 and Optima) or **Volumetrix for Hawkeye** (for Infinia 1).
2. Select **NM Transaxials** to view. Under the **Layout** tab, select "Splash" as the display (or "Hide MIP"). Adjust intensity of the images and change color to inverse.
3. Adjust the Grid to accommodate all images and scroll through the images to center.
4. Annotate the images, then **Screen capture (DatabaseStudy1024BW)** this file and name it accordingly. Multiple Screen captures of transaxial, sagittal and coronals may be needed in order to include all slices of SPECT data.
5. Select **NM Sagittals** and repeat steps 3 through 5.
6. Select **NM Coronals** and repeat steps 3 through 5.
7. Before exiting from Volumetrix MI Evolution for Bone or Volumetric for Hawkeye, go to File, Save MIP.
8. File, Save & Exit
9. Send the following to the **ALIArchive** station: the MIP, all screen captures (transaxial, coronal, and sagittals) and raw transaxial slices. Also include the CT and raw emission images. Send the whole patient file to **MDXEL2**.

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10. If a CT was acquired with the SPECT:
 - a. Follow steps 1-8
 - b. Select **Fused Transaxials** to view. Under the **Layout** tab, select “Splash” as the display (or “Hide MIP”). Adjust intensity of the images.
 - c. Adjust the Grid to accommodate all images and scroll through the images to center.
 - d. Annotate the images, then **Screen capture (DatabaseStudy1024color)** this file and name it accordingly. Multiple Screen captures of **FUSED** transaxial, sagittal and coronals may be needed in order to include all slices of SPECT data.
 - e. File, Save & Exit
 - f. Send the MIP and the Screen Captures (**NM** and **Fused** transaxial, coronal, and sagittals), raw IRACR transaxial slices, and Hounsfield Converted CT.

Interpretation: “Hot” spots are sought in the transverse, coronal, and sagittal sections. Occasional “cold” spots occur (especially AVN when these occur early [first few days] and late [after 4-8 weeks]).

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