

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

MYOCARDIAL - RIGHT-TO-LEFT SHUNT
UPDATED: DECEMBER 2020

CPT CODE: 78428

Indications: Right to left shunt studies are performed on patients with suspected or known right to left shunt. This may occur with some forms of congenital heart disease like Tetralogy of Fallot or with a late ASD. This technique can quantify right to left shunts.

Patient Prep: No patient preparation.

Scheduling: Allow 90 minutes; 60 min of imaging time, 30 min processing.

Radiopharmaceutical & Dose: 4.0 (+/- 20%) mCi (3.2 - 4.8 mCi) Tc-99m-MAA: Dose will be adjusted for patient weight (refer to NMIS or nomogram). At least 98% radiopharmaceutical purity of Tc-99m MAA is required. Tag should be verified within 2 hours of injection.

Imaging Device: GE Infinia Hawkeye 1, 2, 3, and the GE Optima. LEHR collimators should be used.

Imaging Procedure:

1. Inject the radiopharmaceutical. Make sure no air or blood is in the syringe prior to injection.
2. Acquire anterior and posterior whole body views using RT to LT shunt protocol.
3. Acquire anterior, posterior, and laterals of the head using the RT to LT shunt protocol.

Data Acquisition:

WHOLE BODY				
VIEWS	TIME	MATRIX	PATIENT LOCATION	SCAN SPEED
ANTERIOR	USE RT to LT SHUNT PROTOCOL	256 X 1024	FEET FIRST SUPINE	7 CM/MIN
POSTERIOR				

HEAD		
VIEWS	TIME	MATRIX
ANTERIOR	USE RT to LT Shunt PROTOCOL 4 MIN / IMAGE	128 X 128
POSTERIOR		
RIGHT LATERAL		
LEFT LATERAL		

Processing:

WHOLE BODY

1. Select the anterior and posterior WB images from patient index.
2. Select Load To New
3. Highlight Posterior Image
4. Under the IMAGE tab select REORIENT, PAN, ZOOM...
5. Select the Posterior Image so that INPUT=B
6. Click in the Y MIRROR box so the Posterior image is reoriented to match the Anterior
7. Click APPLY and save mirror image
8. Select Anterior and Mirrored image and Load to New
9. Under the IMAGE tab and select COMBINE...
10. Input 1 = A; Range = 1
(RT ANT LT Image)
11. Input 2 = C; Range = 1

- (LT POST RT Reoriented image)
12. Click APPLY & QUIT and save combined image
 13. Under File select EXIT WORKSPACE
 14. Select the new Combined Image
 15. Select Load To New
 16. Select ROI Display Tool and choose the irregular option.
 17. Draw irregular ROI around lungs
 18. Draw irregular ROI around body
(DO NOT GO OUTSIDE FOV)
 19. Select the Statistical Display Tool and click on each of the ROIs and write down the total number of counts within each region.
 20. Use the total number of counts within each region to calculate % shunt (calculation listed below)
 21. Annotate the number counts in each of the regions and all mathematical calculations
 22. Screen Capture and name % SHUNT

$$\% \text{ shunt} = \frac{\text{Total body counts} - \text{Lung counts}}{\text{Total body counts}} \times 100\%$$

HEAD

1. Select ANT, POST, RLAT, and LLAT Brain Images from patient index.
2. Select LOAD TO NEW
3. Annotate
4. Screen Capture and name HEAD STATICS

PACS:

Send all raw images (Whole Body MAA, ANT POST HEAD, LAT HEAD) and both screen captures. (% SHUNT and HEAD STATICS). Do not send mirrored and combined WB images.

Interpretation:

The total body image should be evaluated for non-pulmonary activity and a decision must be made whether this is due to free TcO₄⁻ (thyroid, stomach, bladder, salivary glands), labeled albumin stabilizer (blood pool, major vessels, kidneys, liver), or systemic flow (brain, muscle).

This is a good method of quantifying right to left shunt. However, false positive studies may occur if the label is not adequate. Such studies should be suspected if there appears to be renal excretion of the tracer rather than uptake in the organs receiving the major portion of the cardiac output (cerebrum, thyroid, spleen)

Comments:

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

Reviewed By:

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

Derek Fuerbringer, CNMT
Manager, Nuclear Medicine

Tyler Bradshaw, PhD, DABR
Medical Physicist

Scott Knishka, RPh, BCNP
Radiopharmacist