Ga-^{68} Dotatate PET/CT Scan

Radiopharmaceutical: Ga-^{68} Dotatate
Dose: 5 mCi
T ½: 68 min
Energy: 511 keV
CPT: 78815 (skull to mid-thigh)

Indications

Clinical indications for PET/CT scan include, but are not limited to: localization of somatostatin receptor positive neuroendocrine tumors (NETs) in adult and pediatric patients.

Radiopharmaceutical

- 5 mCi Ga-^{68} Dotatate (5.4mCi MAX) Range: 4mCi – 5.4.Ci
- Pediatric patients will be done at the radiologist's discretion with a dose of 0.054 mCi/kg of body weight up to 5.4 mCi

Patient instructions

- Patient should keep well hydrated with water for 24 hours prior to exam
- Total time at facility is 2 to 2 ½ hours.
- Patient should be off short acting somatostatin analogs for **24 hours** prior to exam
  - Lanreotide
  - Octreotide
  - Pasireotide
  - Sandostatin
  - Sandostatin LAR
  - Signifor
  - Signifor LAR
- Patient should be off long acting somatostatin analogs for **21 days** prior to exam
  - Somatuline Depot

Equipment

- Philips Gemini TF 64 PET/CT Scanner
- Philips Vereos

Procedure

- Perform detailed patient history and initial IV placement.
- After injection of Ga-68 Dotatate ensure patient stays relaxed and comfortable with warmed blankets for their comfort.
- Patient is to consume at least two 8 ounce glasses of water after injection staying well hydrated.
- Patient is to void bladder immediately prior to imaging.
- Ensure area of interest is free of artifact producing material (Metal or dense plastic)
- After a waiting period of 60 min post injection of Ga-68 Dotatate , obtain PET/CT scan from top of head (vertex) to below pelvis. (Arms up if possible)

Acquisition Protocol

- Position patient on scan table and move into scanner until innermost positioning laser is just above patient's head
- Enter proper and accurate patient data on acquisition computer
- Perform CT Surview (Scout)
- Set parameters for CT, PET and lung window.
- Perform low dose CT scan for attenuation correction and follow prompts to move patient into PET gantry to perform PET scan.
- When scanning is complete follow prompts to "End Study".

CT Parameters (Gemini)

- **Scout:**

Length	1200 mm
kV	120
Ma	30

- **Lung:**

Slice Thickness	5 mm
Increment	5 mm
FOV	350 mm

- **Low Dose CT scan:**

Slice Thickness	5 mm
Increment	5 mm
kV	120
mAs/slice (mA)	125 (207)
Collimation	64 x 0.625
Pitch	0.829
Matrix	512
Filter	Sharp (C)
FOV	600 mm (700 mm)

PET Parameters

All bed positions	**4 min/bed**

CT Parameters (Vereos)

- **Scout:**

Length	1400 mm
kV	120
Ma	30

- **Lung:**

Slice Thickness	4 mm

Increment	4 mm
FOV	350 mm
Recon mode	iDose level 4
Filter	Y-Detail (YB)

- **Low Dose CT scan:**

Slice Thickness	4 mm
Increment	4 mm
kV	120
mAs/slice (mA)	50-150 iDose level 4
Collimation	64 x 0.625
Pitch	0.703
Dose management	DoseRight index 15, 3D and Z-modulation ON
Filter	Sharp (C)
FOV	700 mm

PET Parameters

All bed positions	**4 min/bed**
Recon	OSEM. 2 iterations, 17 subsets
Filter	Gaussian FWHM 8mm 1 iteration 6 regularizations Point Spread function ON set 1

Processing

1. From directory screen on PET/CT host, highlight the patient's name you wish to begin processing
2. Highlight the following image sets:
    a. [WB_CTAC] PET
    b. [WB_NAC] PET
    c. Low dose sharp
3. Left click on the FUSION VIEWER button in the upper left corner of the directory screen. This will take a few moments to open the images.
4. Ensure that all image sets are open on the proper image layout

AXIAL AC	AXIAL CT	FUSED AXIAL	AXIAL NOAC
COR AC	COR CT	FUSED COR	COR NOAC
SAG AC	SAG CT	FUSED SAG	COR ROT VOL

5. Left click on STOP button on MOVIE box below COR ROT VOL, and then left click on the X to remove this box.
6. Adjust the intensity of the COR ROT VOL image by holding down the scroll button (the middle of the mouse) and dragging down to brighten and push up to increase intensity. You want to see a small amount of the skin in the background of the image.
7. Adjust the intensity of the NOAC images by holding the scroll button down and increasing or decreasing intensity accordingly.
8. Right click on FUSED COR image and select ALPHA BLEND from menu.
9. Hold left mouse button down and move right until you see “Alpha 60%”
10. Right click again on FUSED COR image and select SCROLL.
11. Scroll through the AXIAL AC image until you get to the end of the images, then come back until you eliminate scatter. Write down slice umbers from each end.
12. Scroll through COR AC until no activity is seen on each end and write the slice numbers down. Do the same for the SAG AC images.
13. Left click on the arrow next to the blue box and select ALL ANNOTATION OFF.
14. Left click on the triangulation tool on the left side of the screen to turn OFF triangulation.
15. Left click on COR ROT VOL, then left click on the SAVE IMAGES AS icon (pencil writing on a disk).
16. In the description box type COR ROT VOL. Set offset to 1 and End off set to 30.
17. Left click on OK.
18. Left click on AXIAL NOAC image, and then SAVE IMAGE AS.
19. In the description box type AXIAL NOAC, and set start offset to smaller number for axial images and end offset to larger number.
20. Left click on OK.
21. Do the same for the COR NOAC, AXIAL CT, and the COR CT images.
22. Left click on AXIAL AC, and then SAVE IMAGE AS.
23. In the description box type AXIAL AC. Set start offset to smaller number and end offset to larger number. Left click in the box next to ACTIVITY CONCENTRATION.
24. Left click on OK.
25. Do the same for the COR AC and the SAG AC images.
26. Left click on the FUSED AXIAL images, and then SAVE IMAGE AS.
27. In the description box type FUSED AXIAL SMART RGB. Change DATA in the top right drop-down box to SECONDARY CAPTURE (SF). Set start offset to smaller number and the end offset to the larger number.
28. Left click on OK.
29. Do the same for the FUSED COR SMART RGB images.
30. Once all of the images are saved, return to the DIRECTORY page, and left click on the REFRESH button at the top right of the screen. Verify that the AXIAL AC, AXIAL CT, AXIAL NOAC and FUSED AXIAL SMART RGB saved images have the same number of images by looking at the # IMAGES column.
31. Do the same for the COR AC, COR CT, COR NOAC and FUSED COR SMART RGB images.
32. Next select the AXIAL AC, AXIAL NOAC, COR AC, COR NOAC, COR ROT VOL and SAG AC images and then left click on COPY TO button at the upper left of the screen. This will open a new window.

33. Highlight FUJIPACS at the left of the screen. Ensure that no other icons are highlighted. Left click on OK.
34. Do the same for the AXIAL CT, COR CT, CT SCOUT, DOSE INFO, FUSED AXIAL SMAR RGB, FUSED COR SMART RGB and LUNG images.
35. Ensure all patient history is typed into the history form on RIS.
36. On FUJIPACS make sure images are in the proper order, click drop down menu RAPA RP,2Monitor, PT tumor

COR AC	COR CT	SAG AC	AXIAL NOAC
AXIAL AC	AXIAL CT	FUSED AXIAL SMART RGB	FUSED COR SMART RGB
COR ROT VOL	COR NOAC	LUNG	SAG CT

37. Ensure that all image sets match in number of slices (i.e. axial images all have same number of slices.
38. Ensure that COR ROT VOL has 30 images
39. Verify that all image sets are complete with no slices missing
40. Place online for Radiologist's interpretation.