

 SELECT RADIOLOGY SOLUTIONS A Division of Radiology Imaging Associates	PET CT Tumor		
	Approval: K. Shamlou, MD	rev:2	7/15/2026

PET CT Tumor

Radiopharmaceutical: 18F-Fluorodeoxyglucose (FDG)

Dose: 15 mCi (Gemini) Weight based for Vereos: 8mCi (<150lb) 10mCi (150-200lb) 12mCi (>200lb)

Pediatric patients will be done at the radiologist's discretion with a dose of 0.18 mCi/kg of body weight.

T ½: 110 min

Energy: 511 keV

CPT: 78815 (skull to mid-thigh); 78816 (whole body)

HCPCS: A9552

Indications

Clinical indications for PET/CT scan for tumor include, but are not limited to:

1. Detection of FDG uptake for diagnosis, staging, restaging, evaluating recurrence, and/or monitoring response to treatment of various types of solid tumors.
2. 18F-FDG PET/CT may also be used in treatment planning for radiation therapy.

Patient Instructions

- Patient should be NPO no less than 6 hours prior to injection but must remain hydrated drinking water only.
- Total time at facility is up to 2 hours.
- Upon scheduling, if the patient has any pertinent studies, please instruct either the patient or the ordering physician's office to make them available for correlation.
- Explain patient preparation in detail, emphasizing:
No exercise or strenuous activity 48 hours prior to exam.
No sugar, artificial sweeteners, caffeine or carbohydrates for 24 hours prior to exam.
Keep body well hydrated with water only for 24 hours prior to exam.
With hold insulin for at least 4 hours prior to appointment time.

Equipment

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

Procedure

- Obtain blood glucose level prior to injection. (Must be below 200mg/dL)
- If serum glucose is over 200 mg/dL, inquire cautiously and completely whether patient has had any type of food intake. If the patient ate or drank, discuss possible options with a radiologist. If the patient is an insulin dependent diabetic, inquire about the last time the patient has had insulin, the last time the patient ate, and what the patient ate. Discuss with radiologist options for morning vs afternoon appointment, fasting times, and insulin times to best get patient glucose under 200 at time of injection.
- After injection, ensure patient stays relaxed and comfortable with warmed blankets. Emphasize to patient no unnecessary movement during the waiting period prior to scanning in order to eliminate muscle uptake of FDG.
- Patient is to consume 16oz of water after injection and before scanning.
- Patients should minimize talking. NO gum-chewing.
- After a waiting period of 60 minutes post injection of FDG, obtain PET/CT scan from base of skull to below pelvis ('eyes to thighs'). Ensure testicles are included for males.

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- For melanoma or multiple myeloma diagnoses, sarcomas of extremities, Merkel cell of extremities, or any time pathology may be present beyond skull base/ mid thigh, scan parameters should extend from just above top of head to just below soles of feet ensuring whole body is included in scan.
- For head and neck protocol, a second zoom acquisition of two beds from skull base down should be performed.

Acquisition Protocol

Scan Type:

- Position patient on scan table and move into scanner until innermost positioning laser is just above patient's forehead
- Enter proper and accurate patient data on acquisition computer.
- Select recommended scan protocol based on patient's body habitus:

Gemini:

1. Small = 70 sec/bed position
2. Normal = 100 sec/bed position
3. Large = 130 sec/bed position
4. Head & Neck = 150 sec/bed position
5. For legs in Melanoma protocol = 60 sec/bed position. This starts below pelvis. Melanoma patients should be attempted to be scanned just once (from above head to below feet).

Vereos:

1. <150lb: 60sec/bed. 150lb-200lb: 75sec/bed. 200lb-250lb: 90sec/bed. >250lb: 120sec/bed
 2. Legs: 40 sec/bed
- Perform CT Surview (Scout view).
 - 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'.

Vereos recon parameters:

- Reocon type: OSEM
- 3 iterations 10 subsets
- Gaussian filter on: FWHM 4, 1 iteration, 6 regularizations

CT Parameters (Gemini)

- Scout:
 Small Normal (LFOV) Large (LFOV)
 Length 1200 mm
 kV 120
 mA 30

- Lung (for all scan types):
 Slice Thickness 5 mm
 Increment 5 mm
 FOV 350 mm

• Low Dose CT scan:

Small Normal (LFOV) Large (LFOV)
 Slice Thickness 5 mm 5 mm 5 mm
 Increment 5 mm 5 mm 5 mm
 kV 120 120 140
 mAs/slice (mA) 100 (166) 125 (207) 150 (249)
 Collimation 64 x 0.625 64 x 0.625 64 x 0.625
 Pitch 0.829 0.829 0.829
 Matrix 512 512 512
 Filter Sharp (C) Sharp (C) Sharp (C)
 FOV 600 mm 600 mm (700 mm) 600 mm (700 mm)

CT Parameters (Vereos)

- Scout: 1200mm length, 120kV, 30mA
- Lung windows: 4mm thickness and increment
- Filter Y-Detail (YB)
- iDose level 2
- FOV 450mm

CT Parameters

- Small:
 - kV: 120 mAs min/max: 40-100
 - 4mm thickness and increment
 - iDose level 4
 - Sharp © filter
 - FOV: 600mm
 - Collimation: 64x0.625
 - Pitch: 0.827
 - Rotation time: 0.75sec
 - Dose right on (Noise reduction 13) Z and 3D modulation ON
- Average:
 - kV: 120 mAs min/max: 40-125
 - 4mm thickness and increment
 - iDose level 4
 - Sharp © filter
 - FOV: 600mm
 - Collimation: 64x0.625
 - Pitch: 0.827
 - Rotation time: 0.75sec
 - Dose right on (Noise reduction 14) Z and 3D modulation ON
- Large
 - kV: 120 mAs min/max: 50-150
 - 4mm thickness and increment
 - iDose level 4
 - Sharp © filter
 - FOV: 700mm

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- Collimation: 64x0.625
- Pitch: 0.703
- Rotation time: 0.75sec
- Dose right on (Noise reduction 15) Z and 3D modulation ON
- X-Large
 - kV: 120 mAs min/max: 50-175
 - 4mm thickness and increment
 - iDose level 4
 - Sharp © filter
 - FOV: 700mm
 - Collimation: 64x0.625
 - Pitch: 0.703
 - Rotation time: 0.75sec
 - Dose right on (Noise reduction 15) Z and 3D modulation ON
 -

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:

• WB_CTAC PET

• WB_NAC PET

• 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 I the middle of mouse and dragging down to brighten and push up to decrease intensity. You want to see a small amount of the skin in the background of image.

7. Adjust the intensity of the NOAC images by holding 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 towards the top of the head and write down the first slice number that has data in all sets. (usually 3 or 4 images into the AXIAL AC data set)

11. Scroll through the AXIAL AC image until you get to end of images, then come back in to image until you eliminate the scatter (usually just 2 to 3 images from each end of the AXIAL AC images). Write down the slice numbers from each end. Make sure that the AXIAL start and end numbers match for the PET and the CT data.

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.

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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 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 Start Offset to 1, and End Offset to 30.
17. Left click on OK.
18. Left click on AXIAL AC, and then SAVE IMAGE AS.
19. In the Description box type AXIAL AC. Set Start Offset to smaller number and End Offset to larger one. Left click in the box next to ACTIVITY CONCENTRATION.
20. Do the same for the COR AC and the SAG AC images
21. Left click on AXIAL NOAC image, and then SAVE IMAGES AS.
22. In the Description box type AXIAL NOAC, and set Start Offset to smaller number for axial images and End Offset to larger number.
23. Left click on OK.
24. Do the same for COR NOAC, AXIAL CT, and the COR CT images.
25. Left click on OK.
26. Left click on the FUSED AXIAL images, and then SAVE IMAGES AS.
27. In the Description box type FUSED AXIAL SMART RGB. Change DATA in top right drop-down box to SECONDARY CAPTURE (SF). Set Start Offset to smaller number, and the End Offset to the larger one.
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 the left click on COPY TO button at the upper left corner of screen. This will open a new window.
33. Highlight FUJIPACS at the right 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 SMART RGB, FUSED COR SMART RGB, and LUNG images.
35. Ensure all pertinent patient history is typed under 'technologist notes' being sure to include:
 - o Dose (of FDG)
 - o Fasting time
 - o Blood glucose level
 - o Scan time post injection
 - o Height and weight
 - o Scan time (in seconds) per bed position
 - o Diagnosis
 - o History and symptoms
 - o Dates of any radiation therapy
 - o Dates of any chemotherapy
 - o Date of last dose of any granulocyte-stimulating factor (GSF), i.e. Neulasta or Neupogen.
 - o Surgical history

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o Any prior studies pertinent to this examination.

Document if patient has had COVID vaccine in the last 6 months, and in which arm the vaccine was injected

38. VIEW images for accuracy.

39. Ensure that all image sets match in number of slices (i.e. axial images all have same number of slices).

40. Ensure that the COR ROT VOL has 30 images.

41. Verify that all image sets are complete with no slices missing.

42. Place online for Radiologists' interpretation.