

PET/CT Skull-Thigh Fort Dodge Protocol

PRINCIPLE:

PET/CT is a non-invasive diagnostic tool that provides tomographic image and quantitative parameters of perfusion, cell viability, proliferation and metabolic activity of tissues. These images result from the use of different substances of biological interest (sugar, amino acids, metabolic precursors, and hormones) labeled with positron-emitting radionuclides.

FDG is an analog of glucose and is taken up by living cells via the first stage of the normal glucose pathways. The principle behind its use for cancer diagnosis is based on the increase glycolytic activity in neoplastic cells. FDG is trapped in the cancer cells due to their high glycolytic activity and is excreted from the body through the urinary track system. A 60 minute interval between FDG administration and image scan is satisfactory to obtain good tumor/background ratio of the tracer.

The cell alteration related to neoplastic transformation are associated with functional impairment that are discernible before structural alteration occur. Therefore, using F-18 FDG can reveal the presence of a tumor while conventional morphological diagnostic modalities do not yet detect evidence of lesions.

The amount of F18-FDG uptake in tumors correlated with tumor growth and viability, so the PET/CT scan and the possible metabolic quantification may provide useful information about tumor characterization, patient prognosis and monitoring the response to anti-cancer therapies. Utilizing PET/CT with F-18-FDG is becoming more widespread for the diagnostic assessment of patients with suspected malignancies, tumor staging and therapy monitoring.

EQUIPMENT AND SUPPLIES:

1. Dose in range of 9-14mCi of F-18 FDG administered IV (angiocath) or port.
2. LSO crystal high resolution imaging system (HRIS) PET/CT scanner.
3. Digital computer system/software.
4. PACs archiving and retrieval system. LEO2 physician workstation. .
5. Access to previous PET/CT scan for comparison.

PATIENT PREPARATION:

1. NPO 6 hours prior to PET/CT scan; water may be taken at any time.
2. Diabetics: NPO 4 hours (are scheduled to best accommodate their glucose level(s): water may be taken at any time. Diabetic medication is to be held for 4 hours as well.
3. TPN and other caloric solution should be withheld for the 4-6hour period, so a "fasting" blood glucose can be achieved.

PROCEDURE:

1. Establish the patient's identification using two methods. Explain the testing procedure to the patient and answer appropriate questions.

2. Using the Accu-check monitor, check the patient's glucose. Levels must be below 200mg/dl. If the patient's glucose level is above 400mg/dl or below 40 mg/dl, a physician must be notified immediately.
3. Begin an IV using a 22-24G angiocath in the patient. Begin to infuse 20mL's of normal saline.
4. Assay F-18 FDG dose (9-14mCi) and administer dose into the needles port (cap) in the IV tubing.
5. Instruct patient to relax for 60minutes.
6. During this time determine if the treatment planning board is required on the PET/CT scanner. Determine if the lap-lasers will be used with the procedure.
7. After incubation period of 60minutes DC the IV and instruct the patient to use the restroom to empty bladder.

COMPUTER SOFTWARE PROTOCOL:

1. Go to patient register. Load patient, last name, first name, DOB, gender, and accurate weight and possible accession number. Select study (PET, PET/CT whole-body Adult, patient position headfirst supine). Once all information is correct, select exam.
2. Go to IMAGING PROTOCOL below.
 - a. Load topogram, once loaded, press the start button on the control panel.
 - b. Upon topogram completion, you may have to increase or decrease number of beds. Typically, there are 6 or 7 beds.
 - c. Once ROI is set load study.
 - d. Press start button on control panel to begin CT.
 - e. Once CT is complete, move the bed into the PET gantry by pressing the MOVE button on the control panel.
 - f. In the PET acquisition, load the correct amount of radiotracer and the correct time of injection and correct minutes per bed. 2 min for BMI 19-29, 3 min for BMI 30-39, or 4 min for BMI 40+.

IMAGING PROTOCOL:

1. Instruct patient to remove all metal (earrings, watches, belts, zippers, dentures, female, bras with under wire and metal clasps.)
2. Have the patient lie on the table with head towards the scanner. Secure patient using safety equipment (waist strap, head cushion, knee cushion and head pads) Attach the connecting tubing to the patient's intravenous access site.
3. Have patient raise their arms over their head in a comfortable position. Position laser light right below eye level. Instruct the patient to lie still. Begin the CT image equipment. At the conclusion of the CT, begin the PET image acquisition.
4. Following completion of all data/image acquisition, perform quality review. If no artifacts are present, dismiss the patient. Prepare the room and equipment for the next procedure.
5. Perform image reconstruction according to the parameters outlined by the physician.
6. Transfer files to the LEO2 and the PACs for physician review and interpretation.
7. Scan the requisition, questionnaire and all other documents that will be needed for interpretation of the study into PACs.

RESULTS:

This is physician-interpreted study.

REFERENCES:

1. Operator's Manual PET/CT medical imaging system.
2. Operator's instructions PACs image archiving and retrieval system.
3. Seminars in Nuclear Medicine Vol 38. No. 2 March 2008
4. "Med-Calc GFR Estimate" website.

Written by: Stephen Kuhn Approved: Dr. Jabour 3/2006, 5/2010, 7/2022 Update: 2/2024

PET/CT Melanoma Whole Body Fort Dodge PROTOCOL

PRINCIPLE:

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FDG is an analog of glucose and is taken up by living cells via the first stage of the normal glucose pathways. The principle behind its use for cancer diagnosis is based on the increase glycolytic activity in neoplastic cells. FDG is trapped in the cancer cells due to their high glycolytic activity and is excreted from the body through the urinary track system. A 60 minute interval between FDG administration and image scan is satisfactory to obtain good tumor/background ratio of the tracer.

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The amount of F18-FDG uptake in tumors correlated with tumor growth and viability, so the PET/CT scan and the possible metabolic quantification may provide useful information about tumor characterization, patient prognosis and monitoring the response to anti-cancer therapies. Utilizing PET/CT with F-18-FDG is becoming more widespread for the diagnostic assessment of patients with suspected malignancies, tumor staging and therapy monitoring.

EQUIPMENT AND SUPPLIES:

1. Dose in range of 9-14mCi of F-18 FDG administered IV (angiocath) or port.
2. LSO crystal high resolution imaging system (HRIS) PET/CT scanner.
3. Digital computer system/software.
4. PACs archiving and retrieval system. LEO2 physician workstation.

PATIENT PREPARATION:

1. NPO 6 hours prior to PET/CT scan; water may be taken at any time.
2. Diabetics: NPO 4 hours (are scheduled to best accommodate their glucose level(s): water may be taken at any time. Diabetic medication is to be held for 4 hours as well.
3. TPN and other caloric solution should be withheld for the 4-6hour period, so a "fasting" blood glucose can be achieved.

PROCEDURE:

1. Establish the patient's identification using two methods. Explain the testing procedure to the patient and answer appropriate questions.
2. Using the Accu-check monitor, check the patient's glucose. Levels must be below 200mg/dl. If the patient's glucose level is above 400mg/dl or below 40 mg/dl, a physician must be notified immediately.

3. Begin an IV using a 22-24G angiocath in the patient. Begin to infuse 20mL's of normal saline.
4. Assay F-18 FDG dose (9-14mCi) and administer dose into the needles port (cap) in the IV tubing.
5. Instruct patient to relax for 60minutes.
6. During this time determine if the treatment planning board is required on the PET/CT scanner. Determine if the lap-lasers will be used with the procedure.
7. After incubation period of 60minutes DC the IV and instruct the patient to use the restroom to empty bladder.

COMPUTER SOFTWARE PROTOCOL:

1. Go to patient register. Load patient, last name, first name, DOB, gender, and accurate weight and possible accession number. Select study (PET, PET/CT whole-body Adult, patient position headfirst supine). Once all information is correct, select exam.
2. Go to IMAGING PROTOCOL below.
 - a. Load topogram, once loaded, press the start button on the control panel.
 - b. Upon topogram completion, you may have to increase or decrease number of beds. Typically, there are 6 or 7 beds.
 - c. Once ROI is set load study.
 - d. Press start button on control panel to begin CT.
 - e. Once CT is complete, move the bed into the PET gantry by pressing the MOVE button on the control panel.
 - f. In the PET acquisition, load the correct amount of radiotracer and the correct time of injection and 3 minutes per bed.
 - g. Go to the RECON tab at the bottom of the screen and select "reconjob" 1 (corrected data set). Change the FWHM to 7.0 from 5.0.
 - h. Now that the PET data is updated and corrected, press load then start.

IMAGING PROTOCOL:

1. Instruct patient to remove all metal (earrings, watches, belts, zippers, dentures: females bras, with under wire and metal clasps.)
2. Have the patient lie on the table with head towards the scanner. Secure patient using safety equipment (waist strap, head cushion, knee cushion and head pads.)
3. Have patient place their arms at the sides. Secure waist strap to hold their arms in the place. Position laser light at the top of the patient's skull. All skin on the patient body is to be included. Instruct the patient to lie still. And begin acquisition will need to be acquired.
4. Once the acquisition is complete, close out the study by clicking on the "close patient" icon. Because the Melanoma protocol includes the entire body, a second acquisition will need to be acquired.

SECOND COMPUTER ACQUISITION:

1. Go to patient register. Click on the search button and highlight and select the patient's name. The patient's name, DOB should already be correct. Enter the accession number Go to study and select PET, PETCT whole-body (adult). For patient position, choose feet first supine. Once patient registration is correct select exam.
2. Go to SECOND IMAGING PROTOCOL below.
3. Load topogram, once loaded, press the start button on the control panel.

4. Upon topogram completion, you may have to increase or decrease number of beds. Typically, there are 7 or 8 beds.
5. Once ROI is set, load study.
6. Press start button on control panel to begin CT.
7. Once CT is complete move the bed into the PET gantry by pressing the MOVE button on the control panel.
8. In the PET acquisition, load the correct amount of radiotracer, the correct time of injection, and correct 1.5 minutes per bed. Due to low attenuation count time may be decrease.
9. Go to the RECON tab at the bottom of the screen and select recon job 1 (corrected data set). Change the FWHM to 7.0 from 5.0.
10. Now that the PET data is updated and corrected, press load, then start.

SECOND IMAGING PROTOCOL:

1. Instruct patient to remove all metal (earrings, watches belts, zippers, dentures; females, bras with under wire and metal clasps.)
2. Have the patient lie on the table with their feet towards the scanner. Secure patient using safety equipment (waist, strap, head cushion, knee cushion and head pads.)
3. Have patient place their arms at the sides. Secure waist strap to hold their arms in place. Position laser light at the top of thighs below the groin. Instruct the patient to lie still. Begin acquisition.
4. Following completion of the data/image acquisition, perform quality review. If no artifacts are present, dismiss the patient. Prepare the room equipment for the next procedure.
5. Perform image reconstruction according to the parameters outlined by the physician.
6. Generate SUV and other data as directed/requested.
7. Transfer files to the PACs and LEO2 for physician review and interpretation.

RESULTS:

This is a physician-interpreted study.

REFERENCES:

1. Operator Manual, PET/CT medical imaging system.
2. Operator instructions PACs image archiving and retrieval system.
3. Seminars in Nuclear Medicine, Vol 38. No. 2 March 2008.
4. "Med-Calc GFR Estimate" website.