



## PRACTICE ISSUE EVIDENCE SUMMARY PET SCAN DIET

### Best Practice Issue

What is the appropriate diet to follow in preparation for a PET scan? What special considerations are necessary for patients receiving enteral or parenteral nutrition?

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### Purpose:

PET scanning uses the glucose analog FDG. The fundamental basis of the imaging is the in vivo distribution of FDG into normal tissues and the strikingly increased uptake in neoplastic tissue. As FDG competes with glucose for transport into cells, hyperglycemia will competitively inhibit FDG uptake into both normal tissues and tumor. Accordingly, hyperglycemia in patients with diabetes, undiagnosed diabetes or on steroids may significantly decrease tumor uptake of FDG and cause unreliable results. Strict control of blood glucose is required to ensure that levels are within the optimal range of 4-10 mmol/L at the time of the test. **Blood glucose >12 mmol/L, <3.6 mmol/L or symptomatic hypoglycemia will necessitate cancelling of the PET scan.**

Patients undergoing a PET scan at the Health Sciences Centre as an out-patient are advised to follow a low carbohydrate diet (limited sugar/sweets, starch, fruit and milk) on the day before the test and for breakfast the day of the test, and to not eat or drink anything except water for 4 hours (patients with diabetes on insulin or medication) or 6 hours (patients with diet controlled diabetes and patients who do not have diabetes) prior to the test.

More definitive guidelines are needed for hospitalized patients who may be receiving one or a combination of oral, enteral or parenteral nutrition.

### Definitions:

Enteral Nutrition – nutrition provided through a feeding tube into the stomach or small bowel in patients who are unable to consume adequate nutrition orally.

Parenteral Nutrition/TPN (Total Parenteral Nutrition) – nutrition provided through the vein, generally containing protein, glucose and fat.

PET Scan – Positron Emission Tomography. A nuclear medicine imaging technique which has a prominent clinical role in the diagnosis, staging, and treatment assessment of cancer.

FDG – Fluorodeoxy-D-glucose. A glucose analog radioactive tracer given intravenously prior to the PET scan. Since rapidly growing tumors utilize glucose, the PET study is used to locate potential areas of high FDG collection or uptake, which are indicative of tumor growth.

## Evidence Review:

There is very limited information on specific dietary guidelines to follow prior to a PET scan and recommendations are often not consistent. A literature search conducted through Medline yielded no appropriate articles. Contact with two centers performing PET scans revealed inconsistent recommendations. At the Seattle Cancer Care Alliance, patients are NPO, including no tube feedings or TPN for 12 hours before a PET scan. At Fairview Health Care System in Minneapolis/St. Paul, no special diet is implemented prior to this procedure. Recommendations from the Society of Nuclear Medicine (SNM)<sup>1</sup> are that patients should be fasting for 4-6 hours before the test (including no glucose-containing IV fluids, parenteral or enteral nutrition) and blood glucose should be <200mg/dL (11 mmol/L) at the time of the test. The Biomed Research Foundation of NW Louisiana PET Imaging Center<sup>2</sup> recommends nothing to eat or drink after midnight except water, with target blood glucose <200 mg/dL. Both the SNM and Biomed Research Foundation guidelines indicate patients who are known to have diabetes may need further instructions.

Therefore, the recommendations listed below, although not evidence based, are based on clinical judgment and expert opinion in an attempt to ensure control of blood glucose within the optimal range of 4-10 mmol/L so that the PET scan study can proceed and not be cancelled.

## Recommendations:

1. The goal is to restrict carbohydrate intake for the 24 hour period preceding the PET scan, for all feeding modalities. (Normal dietary intake is 200 – 300g of carbohydrate per day.)
2. Since PET scans are currently scheduled from 1230-1600 hours, nutrition recommendations for oral feeding should commence at lunch/1200 h the day before the test.
3. For patients without diabetes who are eating: Implement controlled carbohydrate diet/no snacks (with the elimination of milk, juice, fruit and desserts) at lunch meal the day before the test. Continue diet for dinner and breakfast the next morning. See attachment for more detailed diet guidelines. Patients must take only water for 6 hours prior to the test and should be encouraged to drink 2-3 cups of water.
4. For patients with diabetes who are eating: Consume usual controlled carbohydrate diet the day before the test. Breakfast the day of the test should ideally be low carbohydrate but the food plan needs to be determined in consultation with nutrition services and medical staff. See attachment for more detailed diet guidelines. Nothing to eat or drink (except water) for 4 hours prior to PET scan appointment, but continue to drink plenty of water.
5. For patients receiving tube feeding: Continue patient's tube feeding regimen until 2400 h the day prior to the test, at which time tube feed should be held. If necessary to replace tube feed with IV fluid, follow guideline in #8 below. Resume tube feeds post PET scan.
6. For patients receiving total parenteral nutrition (TPN): TPN should be tapered and held by 1800 h the day prior to the PET scan and resumed after the test is completed. Since facilities vary in the time of day that the TPN bags are changed, it may be prudent to simply not order TPN the day prior to the PET scan. Reminder: manage fluids and electrolytes appropriately.
7. For patients with diabetes (receiving oral diet, tube feeding or TPN): The physician responsible for managing the patient's diabetes should be contacted for special instructions regarding medications/insulin to ensure normoglycemia for the PET scan. It is important to avoid short acting insulin for 4 hours prior to the PET scan.
8. For patients receiving intravenous (IV) infusions: Avoid D5W. Recommend ½ normal saline or normal saline.

**Practice Changes:**

1. The PET scan controlled carbohydrate diet can begin at the lunch meal, instead of breakfast on the day preceding the test.
2. The breakfast meal on the day of the test should be ordered as an early tray.
3. There were previously no guidelines for enteral or parenteral nutrition in preparation for PET scan.

**Anticipated Impact:**

1. All patients who are eating will receive a controlled carbohydrate diet for the 24-hour period prior to the test. This will provide a moderately restricted carbohydrate intake. Patient's usual diet can be resumed immediately following the test.
2. Patients who are receiving tube feedings or TPN will likely receive suboptimal nutritional intake for the 24 hour period prior to the test. Usual tube feeding/TPN regimen can be resumed following the test.

**Recommendation for implementation:**

1. Develop Nutrition and Food Service Practice Guidelines for PET scan nutrition recommendations.
2. Unit Managers should be notified of these Practice Guidelines and communicate same to their staff.
3. Ward staff should be aware of the importance of compliance to the recommended diet/nutrition care plan changes pre-PET scan.

**References:**

1. Society of Nuclear Medicine: Procedure Guideline for Tumor Imaging with <sup>18</sup>F-FFDG PET/CT  
<http://www.snm.org/guidelines> March, 2006
2. Biomed Research Foundation of NW Louisiana PET Imaging Center: Physician's Resources – Patient Prep  
<http://www.biomedpet.org/resources-patient-prep.cfm> November, 2006

**These recommendations were reviewed by a number of external reviewers. Feedback was received from:**

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