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ACR PRACTICE GUIDELINE FOR THE PERFORMANCE OF FDG-PET SCINTIGRAPHY IN ONCOLOGY

PREAMBLE

These guidelines are an educational tool designed to assist practitioners in providing appropriate radiologic care for patients. They are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care. For these reasons and those set forth below, the American College of Radiology cautions against the use of these guidelines in litigation in which the clinical decisions of a practitioner are called into question.

The ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the physician or medical physicist in light of all the circumstances presented. Thus, an approach that differs from the guidelines, standing alone, does not necessarily imply that the approach was below the standard of care. To the contrary, a conscientious practitioner may responsibly adopt a course of action different from that set forth in the guidelines when, in the reasonable judgment of the practitioner, such course of action is indicated by the condition of the patient, limitations on available resources, or advances in knowledge or technology subsequent to publication of the guidelines. However, a practitioner who employs an approach substantially different from these guidelines is advised to document in the patient record information sufficient to explain the approach taken.

The practice of medicine involves not only the science, but also the art of dealing with the prevention, diagnosis, alleviation, and treatment of disease. The variety and complexity of human conditions make it impossible to always reach the most appropriate diagnosis or to predict with certainty a particular response to treatment.

Therefore, it should be recognized that adherence to these guidelines will not assure an accurate diagnosis or a successful outcome. All that should be expected is that the practitioner will follow a reasonable course of action based on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The sole purpose of these guidelines is to assist practitioners in achieving this objective.

I. INTRODUCTION

This guideline has been developed by the American College of Radiology (ACR) to guide interpreting physicians performing FDG-PET (fluorine-18-2-fluoro-2-deoxy-D-glucose-positron-emission tomography) oncologic imaging in adult and pediatric patients. Properly performed imaging using FDG-PET is a sensitive method for detecting, staging, and following the effects of therapy of many malignancies. As with all other scintigraphic techniques, maximum diagnostic accuracies are achieved by correlation with clinical findings and other diagnostic modalities, both imaging and nonimaging.

Application of this guideline should be in accordance with the ACR Technical Standard for Diagnostic Procedures Using Radiopharmaceuticals, with particular attention to the prescription and handling of radiopharmaceuticals.

II. GOAL

The goal of FDG-PET scintigraphy is to enable the interpreting physician to detect primary, metastatic, or

recurrent tumors, and to distinguish between benign and malignant disease.

III. INDICATIONS

Indications for these studies include, but are not limited to, the following:

1. Evaluating abnormalities detected with other imaging modalities to distinguish between benign or malignant etiologies.
2. Staging patients with known malignancy.
3. Determining the effect of therapy on known malignancies.
4. Determining if residual abnormalities on imaging studies following treatment represent tumor or post-treatment fibrosis.
5. Searching for an unknown primary when metastases are discovered.
6. Follow-up studies to detect recurrence, especially in the presence of elevated tumor markers or symptoms.

FDG-PET does not work equally well for all tumors. Continuing review of the current literature is recommended to determine the most effective PET applications.

IV. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

See the ACR Technical Standard for Diagnostic Procedures Using Radiopharmaceuticals.

V. SPECIFICATIONS OF THE EXAMINATION

The written or electronic request for FDG-PET scintigraphy should provide sufficient information to demonstrate the medical necessity of the examination and allow for the proper performance and interpretation of the examination.

Documentation that satisfies medical necessity includes 1) signs and symptoms and/or 2) relevant history (including known diagnoses). The provision of additional information regarding the specific reason for the examination or a provisional diagnosis would be helpful and may at times be needed to allow for the proper performance and interpretation of the examination.

The request for the examination must be originated by a physician or other appropriately licensed health care provider. The accompanying clinical information should be provided by a physician or other appropriately licensed health care provider familiar with the patient's clinical problem or question and consistent with the state scope of practice requirements. 2006 (Res. 35)

A. Radiopharmaceutical

Fluorine-18-2-fluoro-2-deoxy-D-glucose (FDG) is administered intravenously in activities of 4-20 millicuries (148-740 MBq). Activities for children should be reduced based on weight or body surface area, and should be as low as practically achievable for appropriate image quality. Lower count rates are usually needed with gamma camera-based PET imaging (coincidence detection). The administered activities should be appropriate to the imaging system used (commonly 4-5 millicuries [148-185 MBq]) for gamma camera-based PET imaging.

B. Patient Preparation

Patients should fast for at least 4 hours prior to the FDG administration. Blood sugar should be less than 200 mg/dL to decrease competition with the FDG. Patients who are diabetic should have their blood sugar under good control prior to the administration of FDG. Ideally, FDG should not be administered within 4 hours of administration of regular insulin, but may be administered as early as 2 hours if necessary, after the patient has been given IV regular insulin. Insertion of a Foley catheter may be helpful in evaluating the pelvis by providing drainage of bladder activity.

C. The Examination

Imaging can begin as early as 45 minutes after FDG administration, although many sites begin imaging later because lesion conspicuity may improve with time. The duration of image acquisition must take into account the decreasing count rate with time, because of the 110-minute half-life of fluorine-18. Regional images may be used to characterize abnormalities identified on anatomic imaging studies. For example, a solitary pulmonary nodule can be evaluated by regional images of the chest. Staging studies are performed using whole-body imaging (base of brain through mid-thigh). In melanoma, imaging to the distal lower extremities may be indicated.

VI. EQUIPMENT SPECIFICATIONS

PET imaging is performed using coincidence detection devices approved for marketing as PET scanners by the FDA. These devices include dedicated PET scanners and gamma cameras with coincidence detection. Attenuation correction may be useful for detecting some lesions and for providing semiquantitative analysis of abnormalities.

VII. DOCUMENTATION

Reporting should be in accordance with the ACR Practice Guideline for Communication of Diagnostic Imaging Findings.

VIII. RADIATION SAFETY IN IMAGING

Radiologists, radiologic technologists, and all supervising physicians have a responsibility to minimize radiation dose to individual patients, to staff, and to society as a whole, while maintaining the necessary diagnostic image quality. This is the concept "As Low As Reasonably Achievable (ALARA)".

Facilities, in consultation with the medical physicist, should have in place and should adhere to policies and procedures, in accordance with ALARA, to vary examination protocols to take into account patient body habitus, such as height and/or weight, body mass index or lateral width. The dose reduction devices that are available on imaging equipment should be active or manual techniques should be used to moderate the exposure while maintaining the necessary diagnostic image quality. Patient radiation doses should be periodically measured by a medical physicist in accordance with the appropriate ACR Technical Standard. 2006 (Res. 17)

IX. QUALITY CONTROL AND IMPROVEMENT, SAFETY, INFECTION CONTROL, AND PATIENT EDUCATION CONCERNS

Policies and procedures related to quality, patient education, infection control, and safety should be developed and implemented in accordance with the ACR Policy on Quality Control and Improvement, Safety, Infection Control, and Patient Education Concerns appearing elsewhere in the ACR Practice Guidelines and Technical Standards book.

Equipment performance monitoring should be in accordance with the ACR Technical Standard for Medical Nuclear Physics Performance Monitoring of Nuclear Medicine Imaging Equipment.

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This guideline was revised according to the process described in the ACR Practice Guidelines and Technical Standards book by the Guidelines and Standards Committee of the Nuclear Medicine Commission.

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