SNMMI AUC Factsheet for FDG PET/CT in Restaging and Treatment Response Assessment in Sarcoma

EXECUTIVE SUMMARY

Nuclear medicine imaging studies are essential for the diagnosis and management of many diseases, including cancer. The ready availability of medical imaging studies in conjunction with concerns about missed diagnoses has, at times, resulted in inappropriate use and overuse of medical imaging technology, including nuclear imaging. The overuse may have resulted in unnecessary financial burden on the health-care system and in some cases unnecessary exposure to ionizing radiation. Overuse and inconsistent use of imaging procedures prompted a push for multi-stakeholder consensus documents outlining the most appropriate and cost-effective use of advanced medical imaging studies.

Precision medicine is evolving to include a variety of data to optimize patient care and improve outcome. Multimodality imaging is paving the way toward this goal. PET/CT with ^{18}F-FDG is now established as an important imaging modality in many clinical conditions, particularly in oncology. Many tumors demonstrate high glucose metabolism as one of the hallmarks of cancer. PET/CT provides combined anatomic and physiologic (glucose metabolism) information that may be used for initial diagnosis, staging, restaging, treatment response assessment, and prognosis in patients with cancer. Moreover, PET information can contribute significantly when other imaging modalities are equivocal.

AUC INTRODUCTION

The purpose of this document is to describe the appropriate use criteria (AUC) of PET/CT in the treatment response assessment and restaging of patients with cancer. For the purposes of this work, the term *assessment of response* is taken to mean the period in which the intended target of the therapeutic regimen is being evaluated, whereas the term *restaging of disease* is taken to mean the period in which there is concern for new or progressive disease after completion of prior therapy. Moreover, this document excludes “initial staging” and “surveillance.”

CLINICAL SCENARIOS FOR SARCOMA

Sarcoma, including osteosarcoma, the Ewing sarcoma family of tumors, rhabdomyosarcoma, and soft tissue sarcoma (including leiomyosarcoma, fibroblastic sarcoma, and liposarcoma) comprises less than 0.2% of all cancers and approximately 20% of all childhood solid tumors. Soft tissue sarcomas account for 7% of all childhood cancers and approximately 1% of adult tumors. Sarcoma often presents with metastatic disease at diagnosis that can include pulmonary and skip bony lesions; soft tissue sarcomas may metastasize through hematogenous dissemination and rarely to nodes.

PET/CT has better sensitivity and specificity for detection of recurrent disease than does conventional imaging or bone scintigraphy. The early detection and management of metastatic disease could improve survival. Bone sarcomas exhibit an increased rate of glycolysis and thus PET/CT studies have been used to assess bone sarcoma. ^{18}F-FDG uptake in heterogeneous tumors can be correlated to the aggressiveness of the tumor and the pathologic grade. This can then be sued to localize the best biopsy site.

Clinical Scenarios for Sarcoma

Scenario no.	Description	Appriopriateness	Score
1	Restaging for detection of local recurrence	Appropriate	7
2	Restaging for detection of metastases	Appropriate	7
3	Treatment response evaluation	Appropriate	8

Rating and Scoring

The scenarios are scored as “appropriate,” “may be appropriate,” or “rarely appropriate” on a scale from 1 to 9. Scores 7–9 indicate that the use of the procedure is appropriate for the specific scenario and is generally considered acceptable. Scores 4–6 indicate that the use of the procedure may be appropriate for the specific scenario. This implies that more research is needed to classify the scenario definitively. Scores 1–3 indicate that the use of the procedure is rarely appropriate for the specific scenario and generally is not considered acceptable.

Methodology

The process for AUC development was modeled after the RAND/ UCLA Appropriateness Method for AUC development. It included identifying a list of relevant clinical scenarios, a systematic review of evidence, and a systematic synthesis of available evidence, while adhering to the Institute of Medicine’s standards for developing trustworthy clinical guidance.

This AUC was developed by the Society of Nuclear Medicine and Molecular Imaging with participation from experts affiliated with the following organizations: European Association of Nuclear Medicine; American Society of Clinical Oncology; American College of Nuclear Medicine; Society for Pediatric Radiology; and Canadian Association of Nuclear Medicine.

For the complete manuscript and listing of references, visit: http://snmmi.files.cms-plus.com/Quality/jnm197988_v1.pdf

JNM Reference
Jadvar H, et al. Appropriate Use Criteria for ^{18}F-FDG PET/CT in Restaging and Treatment Response Assessment of Malignant Disease: J Nucl Med 2017; 58:2026-2037 (10.2967/jnumed.117.197988).