Appropriate Use Criteria for the Use of Nuclear Medicine in Fever of Unknown Origin

AUC INTRODUCTION

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

It is hoped that this document, developed by medical experts knowledgeable in the appropriate use of leukocyte scintigraphy, ^{67}GA scintigraphy, and ^{18}F-FDG PET and PET/CT for use in diagnosing fever of unknown origin (FUO), will improve healthcare outcomes for the intended patient population while helping to decrease unnecessary imaging costs.

This document may also be helpful for use in diagnosing inflammation of unknown origin (IUO), described as an illness lasting more than three weeks, with fever not exceeding 38.3°C (100.9°F) on several occasions, accompanied by elevated inflammatory markers (CRP ≥ 30 mg/L or increased ESR), which remains undiagnosed despite appropriate investigation after at least three outpatient visits or three days of hospitalization. In view of the fact that the criteria for FUO and IUO are similar, except for fever of more than 38.3°C (100.9°F), and that the most common etiologies of these two entities are similar, it is the expert opinion of the workgroup that the recommendations for nuclear medicine imaging of FUO are also applicable to IUO.

The recommendations provided relate only to the appropriate use of nuclear medicine imaging and do not preclude other testing, nor are they intended to replace clinical judgement. Referring health care providers should consider patient history, physical examination, and other test results when contemplating nuclear medicine imaging.

CLINICAL SCENARIOS FOR NUCLEAR MEDICINE IMAGING IN FEVER OF UNKNOWN ORIGIN

^{18}F-FDG PET and PET/CT are the nuclear medicine tests of choice in adults with FUO and should be included in the diagnostic algorithm for this indication. ^{67}Ga scintigraphy should be reserved for those situations in which ^{18}F-FDG PET and PET/CT are not available. Labeled leukocyte scintigraphy should be reserved for those situations in which ^{18}F-FDG PET and PET/CT are not available and there is a high index of suspicion for infection as the cause of the fever. For children, ^{18}F-FDG PET and PET/CT are deemed appropriate; ^{67}Ga scintigraphy and leukocyte scintigraphy are rarely appropriate.

Clinical Scenarios for Fever of Unknown Origin in Adults

Scenario #	Description	Appropriateness	Score
1	Labeled leukocyte scintigraphy	May be Appropriate	4
2	^{67}Ga scintigraphy	May be Appropriate	5
3	^{18}F-FDG PET and PET/CT	Appropriate	8

Clinical Scenarios for Fever of Unknown Origin in Children

Scenario #	Description	Appropriateness	Score
4	Labeled leukocyte scintigraphy	Rarely Appropriate	3
5	^{67}Ga scintigraphy	Rarely Appropriate	3
6	^{18}F-FDG PET and PET/CT	Appropriate	8

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Rating and Scoring

The above clinical 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 clinical scenario and is generally considered acceptable. Scores 4–6 indicate that the use of the procedure may be appropriate for the specific clinical scenario. This implies that more research is needed to classify the use of these imaging agents in the particular clinical scenario definitively, or that some patient sub-populations in the described clinical scenario may benefit more than others. Scores 1–3 indicate that the use of the procedure is rarely appropriate for the specific clinical 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 includes multi-stakeholder identification of a list of relevant clinical scenarios, a systematic review of evidence in the literature, 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: Israeli Society of Nuclear Medicine, European Association of Nuclear Medicine, American College of Radiology, Infectious Diseases Society of America, American College of Nuclear Medicine,7World Molecular Imaging Society, World Association of Radiopharmaceutical and Molecular Therapy.

For the complete manuscript and listing of references, visit: FUO AUC copy Final BOD Approval 1.2.23 Final BOD Approved Website.pdf

For a complete list of Appropriate Use Criteria (AUC) documents go to: www.snmmi.org/auc.