

^{18}F FDG PET-CT Imaging in Pediatric Patients

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Pediatric nuclear medicine is well established and provides invaluable diagnostic information. Pediatric patients are referred to nuclear medicine departments from almost all pediatric specialties-nephrology, oncology, cardiology, endocrinology, gastroenterology and orthopedics. ^{18}F fluorodeoxyglucose Positron Emission Tomography-Computed Tomography (^{18}F FDG PET-CT) imaging is becoming an important tool in evaluation in known and unknown malignancies in children. PET-CT has extraordinary capability to locate the metabolic active lesion. This modality is used to diagnose the primary site of malignancy, to see the metastatic sites, for restaging of disease, to observe the treatment response and recurrence of malignancies locating metabolically active tumor tissue (1,2). The role of PET is fairly well established imaging modality in assessment of lymphoma. This facility has role in diagnosis and management of pediatric sarcomas (osteosarcoma and Ewing sarcoma), soft tissue malignancies and rhabdomyosarcoma (3). In the last few decades, there is remarkable increase in the use of medical imaging. “The Total number of Nuclear medicine procedures in the United State has increased by almost 3-fold from 6.3 to 18 million procedures from 1984 to 2006 with approximately 1% of these procedures being performed in children” (1). Recently media interest and public concern have been increased on the medical use of radiation especially on pediatric patients. For these reasons, pediatric nuclear medicine personnel and referring pediatricians need to have basic understanding of radiation risk and dosimetry. They need to counsel families of pediatric patients properly. “Image gently”- this recommendation is becoming possible

by using dual energy CT (DECT) in PET-CT machine, where low dose CT is used for attenuation correction and anatomical location in fused images. Advanced machine also minimizes the scan time. Weight based radiopharmaceutical dose in children is used in the view of lowering absorbed dose (As Low As Reasonably Achievable-ALARA). There are several accepted international guidelines and International Atomic Energy Agency (IAEA) recommendations about radiotracer dose to the pediatric patients. Those guidelines also respect the physician’s judgment on individual patient. Definitely benefit is considered higher than radiation risk (1,3,4). There are also other challenges to do PET-CT scan on pediatric patients - patients may be needed to sedate and brown fat artifact are kept in consideration. Pediatric patients are to keep in comfortable waiting room. Expert team work is needed including pediatric emergency handling. Professional expertise on reading of scan findings is also required considering the normal physiology and anatomy of growing children. Considering all the discussed things the ^{18}F FDG-PET-CT is becoming essential part of imaging modality wherever needed for pediatric patients’ diagnosis and management.

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