PET/CT in Paediatric Oncology

C. Franzius (Bremen)

PET imaging with 18F-fluorodeoxyglucose (FDG-PET) has been increasingly used in children in recent years, mostly for oncologic indications, after initial studies documented a clinical benefit of FDG-PET in the pediatric age group. Meanwhile, PET has been combined with CT (PET/CT) to advance the capabilities of both technologies. Concurrent PET and CT acquisition in an integrated system with accurate fusion of the metabolic and morphologic information can improve tumor diagnosis (e.g., staging, follow-up, detection of recurrence) in children and adults compared with scans acquired on two separate units.

Accurate diagnosis, staging, and follow-up are essential in planning individualized treatment that is appropriate for the stage of the disease. The higher radiation exposure from PET-CT compared with PET alone has been cited as a disadvantage of PET-CT in children. Because children are at greater risk than adults for radiation-induced malignancies and have a greater cumulative lifetime exposure risk, it is essential to follow the ALARA principle (“as low as reasonably achievable”) in selecting pediatric patients for PET and CT. Furthermore it is essential to choose an adequate imaging protocol (diagnostic CT vs. low-dose CT, with or without intravenous contrast). When making a risk-benefit assessment, however, it must also be considered that these young cancer patients typically undergo very aggressive therapies with a high risk of serious side effects.

This contribution deals with the advantages of PET-CT in children and adolescents and the special requirements and problems relating to its use in this population.

References