

Child-specific doses for pediatric PET patients

February 1 2010

Studies have shown positron emission tomography's (PET) value as a minimally invasive, painless and safe diagnostic tool for many pediatric conditions. In a study published in the February issue of *The Journal of Nuclear Medicine* (JNM), researchers at the Children's Hospital of Philadelphia (CHOP) and the University of Pennsylvania (Penn) gathered data that may provide clinicians with new formulas—specific to pediatrics—to calculate the amount of radiotracer that should be injected based on the patient's weight.

"These findings mean that PET—a very common nuclear medicine procedure—can be used in children with methods that are even more patient-specific than those currently employed," said Roberto Accorsi, Ph.D., former research assistant professor of radiology at CHOP-Penn and lead author of the study.

This study is one more contribution to the medical imaging community's overall efforts to reduce [radiation dose](#) to children. Nuclear medicine specialists are continuously refining methodologies in order to preserve image quality and minimize [radiation exposure](#) during pediatric PET exams. Since medical research published in recent years highlights the health risks of exposure to [ionizing radiation](#), many have looked to the medical community for ways to curb exposure during medical imaging exams. Although the nuclear medicine exam's benefits to the patient far outweigh any potential risks associated with radiation, the nuclear medicine community seeks to uphold practices that are consistent and mindful of patients' concerns.

In nuclear medicine, there are well-established guidelines for administering radiopharmaceutical doses for adults; however, there is little guidance for administering pediatric doses. Thus, the CHOP-Penn study sets out to examine how nuclear medicine physicians can take into consideration a child's lighter weight and body size and adjust the dose and scan time accordingly, while maintaining high-quality imaging for the best diagnosis possible.

Image quality for PET depends strongly on the patient's weight and body build. In other words, the larger and heavier the patient, the more injection dose or possibly a longer scan time is needed to obtain a quality image. For patients who are lighter and have less body mass—such as in pediatric patients—less injection dose or a reduced scan time may still allow for high-quality images.

"The results of this study show that, due to children's relatively small size and light weight, it is possible to reduce radiological dose (or scan time) while preserving image quality as compared to PET imaging in adults," said Dr. Accorsi, whose research was supported through a Research Fellow Award by the Society for Pediatric Radiology Research and Education Foundation. "Minimizing exposure to radiation is important to all patients, but especially for young children."

CHOP-Penn researchers acquired and analyzed data from 73 patients. The patients' weight ranged from 25 pounds to 200 pounds. Researchers report in their study that when following an injection protocol proportional to weight, the data quality of PET images was found to improve with decreasing weight. The study provides practical injection protocols to trade this advantage for decreased scan time or dose at constant image quality.

Studies such as the one published in JNM are helping physicists and physicians gather new data about improving dose regimens to get the

highest-quality diagnostic image while using the lowest amount of radiation practical, adhering to the "As Low As Reasonably Achievable" (ALARA) principle.

Provided by Society of Nuclear Medicine

Citation: Child-specific doses for pediatric PET patients (2010, February 1) retrieved 24 April 2024 from <https://medicalxpress.com/news/2010-02-child-specific-doses-pediatric-pet-patients.html>

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