

عنوان مقاله:

Fetal dosimetry for ^{18}F -FDG PET Imaging during pregnancy: a comparative Monte Carlo study

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خلاصه مقاله:

Introduction: Current reported values of fetal doses from ^{18}F Fluorodeoxyglucose (FDG) in pregnant women imaged with PET scan showed a significant variation. This study aimed to evaluate fetal radiation doses using the last generation of computational pregnant phantoms and also to shed light on one of the uncertainty components of the fetal dose. Material and Methods: In this respect, we used a boundary representation (BREP) series of computational pregnant phantoms to evaluate radiation doses to the fetus. We also reviewed available data on fetal time-integrated activities and evaluated the confidence and prediction (95%) intervals for the existing data. By doing this, the uncertainty of fetal Biokinetic data was taken into account in fetal dose calculations. Results: The fetal doses of 2.3×10^{-2} , 1.53×10^{-2} , and 1.02×10^{-2} mGy/MBq at 3, 6 and 9 months of gestation were estimated. The results also showed the contributions of source organs to the fetal doses. The maternal "urinary bladder contents" and "other organs and tissues" are the main source regions contributing to fetal dose. We also indicated that the Biokinetic variation caused a large uncertainty on fetal dose (with a prediction interval from 1.73×10^{-2} to 3.93×10^{-2} mGy/MBq) at the first trimester of pregnancy, while it is much lower at second and third trimesters. Furthermore, it is indicated that variations on fetal dose outside the determined intervals may be related to the geometrical differences of used computational phantoms. Conclusion: Since the fetal dose is much higher and the radiation exposure is more deterministic at the first trimester of pregnancy, attempting to evaluate the fetal dose is relevant at this stage accurately.

کلمات کلیدی:

^{18}F , FDG PET Imaging Radiation Dosimetry Pregnancy

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