

عنوان مقاله:

^{18}F -Fludeoxyglucose Absorbed Dose Estimation in Fetus during Early Pregnancy

محل انتشار:

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خلاصه مقاله:

The purpose of this study is to assess a rare case of fetal radiation absorbed dose here through ^{18}F -Fludeoxyglucose (FDG) positron emission tomography (PET)/computed tomography (CT) in early pregnancy (5-week-old fetus). The fetal absorbed dose due to the radiation emitted from the mother's body, the fetus self-dose, and the dose received from CT were computed. The 35-year-old patient, weighing 85 kg, was injected with 370 MBq of ^{18}F -FDG. Imaging started at 1 h with CT acquisition followed by PET imaging. The photon and positron self-dose was calculated by applying the Monte Carlo (MC) GATE (GEANT 4 Application for Tomographic Emission) code. The volume of absorbed dose from the mother's body organs and the absorbed dose from the CT were added to the self-dose to obtain the final dose. The volume of self-dose obtained through MC simulation for the fetus was 3.3×10^{-2} mGy/MBq, of which 2.97×10^{-2} mGy/MBq was associated with positrons and 0.33×10^{-2} mGy/MBq was associated with photons. Biologically, the absorbed dose from CT, 7.3 mGy, had to be added to the total dose. The absorbed dose by the fetus during early pregnancy was higher than the standard value of 2.2×10^{-2} mGy/MBq (MIRD DER) because, during the examinations, the mother's bladder was full. This issue was a concern during updating standards.

کلمات کلیدی:

^{18}F -Fludeoxyglucose, fetus, GATE, maternal dose, Monte Carlo simulation, positron emission tomography/computed tomography, pregnancy

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