

Ambient dose from the water phantom injected ^{18}F -FDG

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Abstract

Not only in human medicine, nuclear medicine is also expected to apply to animal patients as veterinary nuclear medicine in Japan. PET is not exception to perform in companion animals. However, although no radiobiologically significant exposure is reported in the countries that perform veterinary nuclear medicine, it is worth to evaluate human radiation dose from animal patient that injected radiopharmaceutical. In this study, the ambient dose from animal phantom filled with 10 L of water and ^{18}F -FDG (100MBq), placed in a stainless cage, was measured with survey meters and glass dosimeters. The effect of time course and distance from the phantom source were also evaluated. The dose rates at the surface of the phantom were 7.9, 0.79, and 0.10 $\mu\text{Sv/h}$ at 12, 18, and 24 hours after ^{18}F -FDG injection, respectively. And the dose rates at 50 and 100 cm from the surface of the phantom were 0.34 and 0.13 $\mu\text{Sv/h}$ at 12 hours, and 0.05 and 0.03 $\mu\text{Sv/h}$ at 18 hours, respectively. Under proper condition, the estimation of the cumulative dose of a veterinarian, animal owner, and public did not exceed the dose limit and dose constraint. Considering the biological half life, since live animal actively excretes the injected radiopharmaceutical out of the body, the real exposure to human would be much less than the estimation. Therefore, also in veterinary nuclear medicine, the risk of the radiation exposure of ^{18}F -FDG from animal patient would be properly controlled in safe based on the protocol with ALARA concept.