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Dose rates from patients leaving a unit after PET/CT with ^{18}F (FDG and Choline) are safe.

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Introduction



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There is a general assumption that the dose rates from patients submitted to radiopharmaceutical clinical investigations are low and therefore, no specific radiological protection measures are needed regarding close relatives, general population and the environment.

Purpose



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To collect data to confirm this assumption, as a valid statement for PET studies, comparing the results with the only known dose rate restriction value of $50\mu\text{Sv/h}$ (Florida Administrative Code, NUREG 1492) reported in the literature.

Materials and Methods



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Data were collected from 504 consecutive patients undergoing PET/CT investigations, with ^{18}F labelled molecules at the time of leaving the unit.

All measurements were made at 1 meter at the level of the urinary bladder with patients standing.

Results



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In 318/504 (63%) of the cases, the dose rate was lower or equal to $6.15\mu\text{Sv/h}$.

Time between injection and measurement (hours)	< 1:00	1:00 - 2:00	2:00 - 3:00	3:00 - 4:00	4:00 - 5:00	> 5:00
Average dose rate	5,42	11,28	8,45	6,15	4,69	2,75
Number of patients	3	23	163	210	90	15
% of patients	0,6	4,6	32,3	41,7	17,9	2,98



Results

In 236/504 (46.8%) the BMI was between >18.5 and <24.9 with an average dose rate of $6.38\mu\text{Sv/h}$. Having 82,1% of the patients an average dose rate of less them $6,95\mu\text{Sv/h}$

Body Mass Index (kg/m ²)	< 18,5	18,5 - 24,9	25- 29,9	30 - 34,9	35 - 39,9	>40
Average dose rate	5,34	6,38	6,95	8,35	8,19	5,84
Number of patients	26	236	179	49	12	2
% of patients	5,2	46,8	35,5	9,7	2,4	0,4
Average activities (MBq)	181,9	214,0	249,3	263,9	321,2	325,1

Results



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Using the recommended administered activities of ^{18}F -DG or ^{18}F -Choline the dose rate was lower than the proposed limit. For the worst case scenario, when patients are sent out of the unit just 1 to 2 hours after the injection, the dose rate was always much lower than $50\mu\text{Sv/h}$.

Conclusion



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Our data confirm that for these types of diagnostic procedures (using the recommended activity levels) there is no significant additional radiological risk to patients' relatives, general public and the environment.