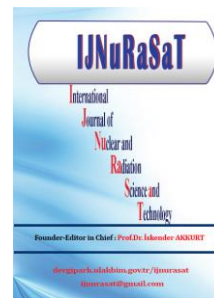




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Research Article

Measurement of the Radioactivity of Radiopharmaceuticals Tc-99m[#]

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Abstract As the ionizing radiations are used commonly both of the radio diagnostic and radio therapy applications, both the employees and patients are exposed the harmful effects of the ionizing radiation. In this study, after the applications of 15-30 µCi Tc-99m injection at the Nuclear Medicine Unit of Amasya Sabuncuoğlu Şerafeddin Training and Research Hospital, the dose of radiation that has been occurred at the environment is examined according to the different parameters.

1. Introduction

Living on the earth that we live on is exposed to radiation so-called natural radiation. The average annual value of the effective dose of radiation received by way of natural radiation is about 2.4 mSv [1].

Common dose of natural source and medical practise are 85% and 14% respectively, the rest is composed of professional and other artificial sources of radiation [2]. Radiopharmaceutical, which are used at nuclear medicine for the purpose of diagnostic and treatment, are taken by inhalation or injection. After keeping it at the target organ the image (uptake) can be taken. Gamma camera is positioned under the patient in the imaging process. Images planar or tomographic (SPECT) can be taken. Images computer or evaluation by a specialist diagnosed the disease is recorded in movies.

For this purpose, diagnostic procedures are also commonly used by Tc-99m radio nuclide. Radiopharmaceuticals will be selected to display specific to each organ. The amount stated in the international standard amenities (50 µCi 30 µCi) they are administered to patients by intravenous or oral [3].

The amount of activity in the treatment of radionuclides used for the purpose is much higher compared to diagnostic methods.

2. Materials and Method

In this study, health physics, medical physics, and some tests were designed for applications Fluke Victorian ASM990 radiation detectors are used ASM 990 series, nuclear medicine, security offices, diagnosis and emergency medical applications such as X-ray physics can be used in a broad framework [4].

This study was done in the Amasya Şerafeddin Sabuncuoğlu University Training and Research Hospital-nuclear medicine unit, Imaging involves the measurement of the radiation emitted to the environment during the irradiation dose.

Depending on half-life of the radionuclide using radiation rate will decrease. Table 1 is given half-lives of some of the most commonly used radiopharmaceuticals

Table 1. The half- life radionuclide and ALI values

Radionuclide	half-life time	ALI min (ICRP-61)
F-18	109.74 min	4×10^8
P-32	14.29 days	5×10^6
Tl-201	73.06 hours	3×10^8
I-131	8.04 days	8×10^5
Tc-99m	6.02 hours	1×10^9

Annual Limits on Intake (ALI) is the Becquerel of radioactive material (Bq) annual limit values in terms of can body [5].

In the chant of 15 μ Ci it is observed that change with the distance from the patient after radiopharmaceuticals injection. Emitting radiation decreases as a function of increasing distance.

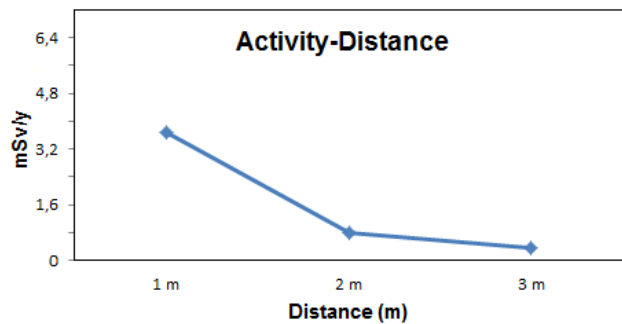


Figure 1. Tc-99m activity as -1 patient was injected with the dose the distance to the measured.

The amount of radiation that spread around the patient waiting room, because of its half-life, decreased with time while lead shielding around the propagation is prevented.

3. Results and Conclusions

In this study, measured values of distance-dose relationship with the patient shooting has been measured and it was found that don't exceed the allowable limit value of the phase following 4mSv. The results were displayed in figure 1. ICRP, EURATOM and TAEA such applications made by national bodies have set maximum radiation dose for radiation staff and patients can get exposed to this practice. Additionally, the dose rate specified in TAEA legislation 1 meter away, 30 μ sv / hour until it falls below the room project incubated at room waiting insulated found suitable [6].

This is by drinking lots of water with radioactive material after examination well as providing faster excretion of urinary tract. NRC radiation safety rules, radiopharmaceuticals applied to the patient's

dose rate measured at 1 m from the value (<50 mikroSv / h) to be sent to the home permit [3].

Clark and his friends, in conventional nuclear medicine studies in 1992, estimate the daily exposure dose of 12 employees as μ Sv. The value of the whole body effective dose of 2.8 mSv / year has been measured and this value is permitted has been shown to exceed the limits of 20-50 mSv[7].

Benatar N.A. 370 MBq of FDG studies in 2000 after injection 1 hour uptake in the patient's next rest period, respectively 0.1 mA a person is exposed to 0.59 mSv and 0.07 mSv dose at 1 m [8]. UNSC 2000 in Table 2 report, based on patient doses in nuclear medicine tests are given [9].

Table 2 -Patient doses in nuclear medicine tests are given[9].

Examination	Effective Dose (mSv)
brain	7
bone	4
heart	8

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