Dedication

This work is dedicated to my father, who pray a lot for my success, my mother soul, my brothers and sisters for their endless support and kindness, to my teachers whose efforts are illuminating the pages of this research and paving the way of knowledge for me and colleagues

ACKNOWLEDGEMENT

I am greatly indebted to my Supervisor **Dr/ Mohammed Ahmed ALI,** who played a knee-role and also to his kind support and help during my work in this research. I express my deep gratitude to **Dr. Mohammed Elfadil** the head of radiotherapy department who extended the most possible help in completion of my study.

Special thanks to Miss**/ Miriam**, Mr**. Nader.** Who made all possible steadfast support and help in order to let this work sees light. I want to thank the teachers of college of medical radiological sciences department of Radiotherapy, who made this research possible.

ABSTRACT

This study was performed in hot lab of nuclear medicine department in radiation and isotopes centre, Khartoum (RICK) over thirteen days extending from 31of July to the 12 august 2010. Tc99m generator from (radioisotopes production division ,atomic energy commission, Syria) was selected for the study. Measurements of dose were performed in nine points distributed in hot lab, measured by high sensitive survey meter, dose calibrator and audible giger muller.

The results showed that maximum exposure dose inside fume hood was 3.2 mSv during elution (thirteen days) for hands exposure .The total body exposure was 0.101 mSv during elution .The exposure rate decreases at all points, where the distance increase according to inverse square law, and the exponential equation $y = 3203e^{-0.97x}$ **.** The summation of doses during elusion lead to exposure dose rate equal to 3.2 mSv at point one which in the range of permissible dose of the hands and represent only 6.4 % of the Maximum Permissible Dose for one generator and the number of generators per year in Radiation and Isotopes Centre Khartoum in average of twenty. If only one technologist eluted all generator per year would exceed the maximum permissible dose by 28%.

In addition, the summation to the total body exposure out side fume hood for 13 days was 0.101 mSv ,which in the range of permissible dose of the workers and represent only 0.5% of the maximum permissible dose , and for twenty generator represent 10% of the maximum permissible dose. the measurements at these points was internationally within the permissible levels .

الخلاصة

هذه الدراسة أجريت في المعمل الإشعاعي بقسم الطب النووي بالمركز القومي للعلاج بالأشعة و الطب النووي , في الفترة من 31/يوليو 2010 إلى 12/أغسطس /2010 علي مولد التكنيشيوم 99 من(هيئه الطاقة الذرية السورية قسم دائرة إنتاج النظائر المشعة) الذي اختير للدراسة وهنالك تسعه نقاط موزعه في المعمل الإشعاعي وقيست بواسطة جهاز المسح الإشعاعي عالي الحساسية وجهاز قايقر مولر المسموع .

وأوضحت النتائج أن اعلي جرعة تعرض في (مكان الايدى حيث المصدر مباشرة)هي 3.2 ملي سيفرت خلال الاستحلاب (ثلاثة عشر يوما) للأيدي . وكان التعرض لكل الجسم 101.05 مايكرو سيفرت خلال الاستحلاب ووجد ان معدل التعرض يتناقص في كل النقاط مع زيادة المسافة وفقا لقانون التربيع العكسي ومجموع الجرع خلال الاستحلاب يقود إلي معدل تعرض يساوي 3.2 ملي سيفرت في النقطة الأولي (مكان الأيدي حيث المصدر مباشرة) وهو وفقاً للمعدل المسموح به عالمياً ويمثل فقط 6.4% للمولد الواحد، ومتوسط عدد المولدات في السنه للمركز القومي للعلاج بالاشعه والطب النووي هو 20 مولد.اذا استحلب تقني واحد كل المولدات في العام سوف يتجاوز الحد المسموح به عالمياً بنسبة 28%.

بالإضافة للمجموع الكلي خارج (مكان الأيدي حيث المصدر مباشرة) للثلاثة عشر يوماً كان 101. 0 ملي سيفرت وهو في الحد المسموح به للعاملين عالمياً ويمثل 0.5 % ،وللمولدات العشرون تمثل 10% من الجرعه المسموح بها . وهذه القياسات للنقاط تعتبر في الحد المسموح به عالمياً.

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List of Abbreviation

RICK	Radiation and Isotopes Center Khartoum
SPECT	Single Photon Emission Computed Tomography
DNA	Deoxyribo Nuclic Acid
V	Volt
F	Fluor
Mo-99/Tc-99m	Molybdenum-99/Technetium-99m generator
ALARA	As low as reasonable achievable
ICRP	International Commission of Radiation Protection
Tc ^{99m}	Technetium-99metastable
CT	Computed Tomography
MRI	Magnetic Resonance Imaging
PET	Positron Emission Tomography
FDG	Fluorodeoxyglucose
^{131}I	Iodine 131
OH$^{\cdot}$	Hydroxyl free radical
SPECT	Single Photon Emission Computed Tomography
IAEA	International Atomic Energy Agency
GY	Gray
Ms	milli sievert
RSO	Radiology Safety Officer
kev.	Kilo Electron Volt
NM	Nuclear Medicine
GM	Geiger Muller
µGy/hr	Micro Gray per Hour
NaI	Sodium Iodide
TLD	Thermo luminescence Dose

RAD	Radiation Absorbed Dose
Mci	Millie Curie
Mev	Mega electron volt
FDA	Food Drug Administration
MAA	Macro Aggregated Albumin
EDTA	Ethylene Diaminetetra Acetic Acid
PTSM	pyru- valdehyde N4-mthylthiosemicarba-zone
Dpm	Disintegration per minute

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