Sudan University of Science and Technology
College of Graduate Studies

MeasurementEffective Radiation Dose
In of Patient Myocardial Infarct Imaging using
Tc-99m – Pyrophosphate

قياس الجرعة المؤثرة للمريض في فحص احتشاء عضلة القلب باستخدام
بايروفروسفاتm99 تكتشيوم

A complementary research submitted for partial fulfillment of the requirements
of M.Sc. degree in Nuclear Medicine Technology

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DeDication:

To my parents, who give me support always and who encourage me to do this work …

To my brothers ….

To my husband and sons…
Acknowledgment

Firstly, I thank the Almighty God for unlimited help, health, strength and patience to complete this work.

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To all of those who helped me along the time of this work, I'd like to express my sincere gratitude and my deep appreciation.
abstract

This study was conducted at Alnilain Diagnostic Medical Center in Khartoum, 50 patients was investigated for diagnosis of myocardial infraction using Tc-99m pyrophosphate agent. The administered activity was calculated based on patients weight which ranged between (70-140) Kg for the study sample. The effective dose for each patient was calculated using the equation:

Effective dose = sum of [organ doses x tissue weighting factor].

The effective dose (E) to an individual was found by calculating a weighted average of the equivalent dose (H) to different body tissues, with the weighting factors (W) designed to reflect the different radio sensitivities of the tissues:

\[ E = \sum_i H_i W_i \]

The data was analyzed using statistical program of social studies (SPSS) and Microsoft excel program.

Patients weights varied between (70-140 Kg) and administered activities were found to be between (3.75-5.56 mCi) depending on the weights of patients and the average effective radiation doses in the case of the two cardiac imaging studies (stress and rest) were (0.98-4.47 mSv) and the average tissue weighting factors were (14.67-95.44). It was found that the effective radiation dose was directly proportional to the patient weight.
المستخصص

في هذه الدراسة تم حساب الجرعه الإشعاعية المؤثرة في حالة تصوير أمراض القلب عن طريق استخدام جهاز القاما كاميرا وتم عمليه التصوير على مريض שתי تصوير تحت تأثير الجهد وتصوير عند الراحه واجري المسح لعدد 50 مريضاً بواسطة حقن المريض بعنصر التكنيشيوم 99 م وجري ذلك عن طريق تخطيط القلب المستمر أثناء القيام بفحص الجهد او عند أعطاء بعض الأدوية القلبية البديلة للتميز بين سرعة ضربات القلب وتم خلالها حقن المريض بواحد العناصر المشعة ثم تؤخذ صورة لعَضلة القلب بتوجيه القاما كاميرا لالتقاط المواد المشعة التي سكنت بخلايا عضلة القلب (صورة جهد) بينما تؤخذ الصورة الثانيه بنفس الطريقه المتبعه لاخذ الصورة الأولي بعد ساعتين (صورة عند الراحه). وتم حساب الجرعه بواسطة معادلة الجرعه المؤثرة

\[ E = \sum_i H_i W_i \]

ووجد أن أوزان المرضى تتواجد بين (70-140) كجم وكانت الجرعه في اختبار الراحه (3.75) أما في حاله الجهد (3.33) وذلك اعتقاداً على أوزان المرضى وكان المتوسط للجرعات في حاله الاختبارين معاً (4.47-0.98) ومتوسط الوزن يساوي (14.67-44.95).
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