

Sudan University of Science and Technology
College of Graduate Studies

**Measurement Effective Radiation Dose
In of Patient Myocardial Infarct Imaging using
Tc-99m – Pyrophosphate**

قياس الجرعة المؤثرة للمريض في فحص احتشاء عضلة القلب باستخدام
بايروفوسفات 99m تكنيشيوم

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

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2017

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 .

Then, I'd like to express my deep and sincere gratitude to my supervisor

Dr. Awad Abdalla Adlan, for his supervision and guidance that set me on the right track, and I am very thankful for his detailed and constructive comments and for his support and personal guidance for this work.

Special thanks to the staff of Al Nilein Medical Diagnostic Center in Khartoum.

From the very beginning until the end of this work, I owe a tremendous debt of gratitude and respect to my dear father, and mother. None of this work could have been achieved without their kind support and endless encouragement. Thanks to father and mother.

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 (70-140Kg) and administered activities were found to be between (3.75-5.56mCi) 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 (0.98-4.47mSv) 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.

المستخلص

في هذه الدراسة تم حساب الجرعة الإشعاعية المؤثرة في حالة تصوير امراض القلب عن طريق استخدام جهاز القاما كاميرا وتتم عملية التصوير علي مرحلتين تصوير تحت تأثير الجهد وتصوير عند الراحة واجري المسح لعدد 50 مريضا بواسطة حقن المريض بعنصر التكنيشيوم 99م ويجري ذلك عن طريق تخطيط القلب المستمر اثناء القيام بفحص الجهد او عند اعطاء بعض الادويه القلبية البديله للتمرين التي تزيد من سرعه ضربات القلب ويتم خلالها حقن المريض باحد العناصر المشعه ثم تؤخذ صورة لعضلة القلب بتوجيه القاما كاميرا لالتقاط المواد المشعة التي سكنت بخلايا عضلة القلب (صورة جهد) بينما تؤخذ الصورة الثانيه بنفس الطريقه المتبعه لآخذ الصورة الاولي بعد ساعتين (صورة عند الراحة). وتم حساب الجرعه بواسطه معادله الجرعه المؤثرة

$$E = \sum_i H_i W_i$$

ووجد ان اوزان المرضي تتفاوت بين (70-140كج) وكانت الجرعه في اختبار الراحة (3.75) اما في حاله الجهد (3.33) وذلكاعتمادا علي اوزان المرضي وكانمتوسط الجرعات في حاله الاختبارين معا (0.98-4.47) ومتوسط الوزن يساوي (95.44-14.67) .

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