

بسم الله الرحمن الرحيم

-: الآية

**قال تعالى: (اللَّهُ نَزَّلَ أَحْسَنَ الْحَدِيثِ كِتَابًا مُتَشَابِهًا
مَثَانِي تَقْشَعُرُّ مِنْهُ جُلُودَ الَّذِينَ يَخْشَوْنَ رَبَّهُمْ ثُمَّ تَلِينُ
جُلُودُهُمْ وَقُلُوبُهُمْ إِلَى ذِكْرِ اللَّهِ ^ج ذَلِكَ هُدَى اللَّهِ يَهْدِي بِهِ
(مَنْ يَشَاءُ ^ج وَمَنْ يُضِلِلِ اللَّهُ فَمَا لَهُ مِنْ هَادٍ**

صدق الله العظيم

(الزمر الآية 23)

Dedication

This research dedicated to the soul of my dear father, my kind full angel my mother who guided me from the first step on and never let me fall...

Acknowledgement

I would like to express my deepest appreciation to all those who provided me the possibility to complete this research. I am thankful for their aspiring guidance, invaluable constructive criticism and friendly advice. I am sincerely grateful to them for sharing their

truthful and illuminating views on a number of issues related to the research.

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I express my warm thanks to my family. A special feeling of gratitude to my loving parents, Aida and Elsadig Mkki, whose words of encouragement and push for tenacity ring in my ears .My brothers : mohammed,moaiad and My sisters :Rawia,Razaz,Reham,Remaz,Rahfaa have never left my side and are very special.

I give special thanks to my best friends, colleagues and teachers.Finally I dedicate this work and give special thanks to my nephews: Lojain, Eyas, Esaf and Mustafa their small hands inspire me and their small hearts filled with unconditional love.

Abstract

Several factors contribute to the accuracy of the delivered dose to patients in external-beam radiotherapy (EBRT). Although some of these factors can be checked by implementing suitable quality control procedures, films are highly recommended method for assessment of radiotherapy treatment field. This study was conducted at radiotherapy department, Radiation and Isotopes

Center of Khartoum (RICK), Khartoum state, Sudan, from July 2014 up to December 2014. In order to assess the radiotherapy beam using portal film and by measuring the field size and the penumbra size and the uniformity. The field size of two type of co-60 was measured to be (9.4×9.4) cm and (9.1×9.1) cm, for linear accelerator machines it was 10×10 cm exactly as the reference field size, and there is no area reduced in liniacs. The penumbra size for the two type of co 60 machine was measured also and it was 1.2 cm and 1.0 cm, and the penumbra size of the linear accelerator machines was found to be 0.4cm and 0.4cm. The area of the field that received radiation by 100% was measured and it was 94.1 % and 91.1 % in co60 and 100 % for linear accelerator machine and that means liniacs deliver the 100% of the dose to the useful field size. The dose percentage in the field for co-60 was 98.0 % and 94.1 % and thus the dose in the border of field 83.1 % and 89.0 % and it's different in liniacs because the dose percentage in the field was 78.4% and 78.4% and there is no measurable dose outside the field size of liniacs.

المستخلص

هناك العديد من العوامل التي تساهم في ايصال الجرعه المطلوبه للمريض بدقه في حالة العلاج بالاشعه من المصادر الخارجيه ,وبالرغم من ان بعض هذه العوامل يمكن ضبطها من خلال عمليات ضبط جوده مناسبه , لكن يعد الفيلم من اكثر الطرق التي ينصح بها لتقييم حزمة الاشعه العلاجيه. اجريت هذه الدراسه في المركز القومي للعلاج بالاشعة والطب النووي - الخرطوم, خلال الفتره من اغسطس 2014 الي ديسمبر 2014. والهدف من هذه الدراسه هو تقييم الحقل الاشعاعي العلاجي باستخدام الفيلم. تم استخدام جهاز الكوبالت-60 والمعجل الخطي في تصوير الفيلم وتحليله باستخدام برنامج تحليل الصور(أي دي إل) , لقياس حجم الحقل الاشعاعي , وشبه الظل , والتأكد من تماثل الحزمه الاشعاعيه. وجد ان حجم الحقل يساوي (9.4×9.4) سم بالنسبه للنوع الاول من الكوبالت -60 و (9.1×9.1) سم للنوع الثاني. وهذا يعني ان 94% للنوع الاول , وللنوع الثاني 91% من الحقل الاشعاعي يحصل على جرعه مقدارها 100%. اما بالنسبة للمعجل الخطي فقد وجد ان حجم الحقل الاشعاعي يساوي (10×10) سم وهو مطابق تماما للحقل الاشعاعي المرجعي , وهذا يعني ان كل الحقل الاشعاعي يحصل على جرعه تساوي 100%. تم قياس شبه الظل ايضا ووجد انه يساوي (1.2) سم للنوع الاول و(1) سم للنوع الثاني من الكوبالت -60 , بالنسبه للمعجل الخطي وجد ان قيمة شبه الظل تساوي 0.4 سم. وجد ايضا ان النسبه المئويه للجرعه داخل الحقل بالنسبه للنوعين من الكوبالت 60 على التوالي يساوي 98% و 94.1% , اما للمعجل الخطي 78.4% .

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List of abbreviations

IAEA	International atomic energy association
IDL	Interactive data language
EPRT	External beam radiotherapy

CO-60	Cobalt-60
LINACS	Linear accelerator
ROI	Region Of Interest
SSD	Source skin distance
F.S	Field size
SPECT	Single photon emission computed tomography
FWHM	full-width at half-maximum
SOBP	spread-out Bragg peak
NEMA	National Electrical Manufacturers Association
2D	localized two-dimensional
MV	Mega voltage
IEPs	intermediate energy x-ray photons
TIFF	tagged image file format
TL	Thermoluminescent