

## الآية

قال تعالى:

وَلَمَّا نَسُوا اللَّهَ فَنَسَتْ أَلْوَانُهُمْ مِمَّا كَانُوا يَعْمَلُونَ  
مُخْتَلِفٌ أَلْوَانُهُ كَذَلِكَ إِنَّمَا يَخْشَى اللَّهَ مِنْ عِبَادِهِ الْعُلَمَاءُ إِنَّ اللَّهَ عَزِيزٌ  
غَفُورٌ { صدق الله العظيم

سورة فاطر الآية 27

# *Dedication*

I dedicate this thesis to:

My precious daughter

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My parents

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My husband

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My family

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My friends

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My colleges

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## ***Abstract***

CT scan is one of the most valuable tools used in the centers of modern health care and are accompanied by radiation dose greater than that of the normal radiographic and must be therefore use carefully to protect patients from radiation. The aim of this study to compare between radiation dose and image quality and to compare between CT brain protocols and radiation dose . Random samples consist of 30 patients who underwent CT brain examination. The patients data registered(age, gender, exposure factors(kv, mAs, exposure time, slice thickness, No of slices) and the DLP, CTDI. where the distribution of the patients was 13 women and 17 male, ages from 6 months to 70 years. The study group has been taken from Modern medical center, Alzaytouna specialist hospital and the Advanced diagnostic center, samples of the population from Khartoum - Sudan. Study was conducted in the period from October 2013 to February 2014 where the study showed that the radiation dose generally increase with intensity of the current, exposure time, the thickness of the slice and the number of slices, also study showed that the image quality increases with radiation dose, However the study showed there is an existence of images with good to very good in quality in less radiation dose . The artifacts generally increases as the exposure time increase and has a close association with movement of the patient. where the study showed that the radiation dose generally increase with mAs, scan time, slice thickness and the number of slices and showed that the image quality increases with radiation dose, However there is an existence of 20% of mages having acceptable, good and very good in quality when we reduce the radiation dose to the half . Also The study showed that artifacts generally increases as the exposure time increases and has a close association with movement of the patient.

## ملخص البحث

فحوصات التصوير الاشعاعي بتقنية التصوير المقطعي هي من اكثر الادوات المستخدمه قيمة في مراكز الرعاية الصحية الحديثة وتصاحبها جرعة اشعاعية اكبر من التصوير الاشعاعي العادي ولذلك يجب استخدام التصوير الاشعاعي المقطعي بعناية لحماية المرضى من الاشعاع. الهدف من هذه الدراسة المقارنة بين الجرعة الاشعاعية وجودة الصورة ايضا المقارنة بين بروتوكولات الاشعة المقطعية للمخ والجرعة الاشعاعية وضبط اقل جرعة اشعاعية للحصول على صورة مقطعية جيدة.

تم أخذ 30 عينة عشوائية تم تسجيل المعلومات الخاصة بالمرضى كالأتي (العمر, الجنس, عوامل التعريض (الكيلوفولت , الملي امبير, زمن التعريض, سمك الشريحة, عدد الشرايح) حيث كان توزيع المرضى 13 من النساء و 17 من الذكور اما اعمار المرضى تراوحت بين 6 شهور إلى 70 سنة. وقد تمت الدراسة وأخذ المعلومات والبيانات من المركز الطبي الحديث, مستشفى الزيتونه التخصصي, المركز المتطور بحري والعينات من سكان الخرطوم- السودان. اجريت الدراسة في الفترة الزمنية من اكتوبر 2013 إلى فبراير 2014 حيث اظهرت الدراسة ان الجرعة الاشعاعية عموما تزيد بزيادة شدة التيار, زمن التعريض, سمك الشريحة و عدد الشرايح. ايضا اظهرت الدراسة ان جودة الصورة عموما تزيد بزيادة الجرعة الأشعاعية على الرغم من ذلك أظهرت الدراسة وجود 20% من الصور ذات جودة مقبولة , جيدة و جيدة جدا في جودتها عند تخفيض الجرعة الإشعاعية إلى النصف . وقد اظهرت الدراسة أن artifacts عموما يزيد بزيادة زمن التعريض وله ارتباط وثيق بحركة المريض.

**Abbreviations:**

ALARA: as low as reasonably achievable.

AAPM: American association of physicists in medicine.

ACR: American college of radiology.

Bq: Becquerel.

BJR: British journal of radiology

CT: computed tomography.

CTDI: computed tomography dose index.

DLP: Dose length product.

Eu: European commission.

Gy: gray.

IAEA: international atomic energy agency.

ICRP: International commission OF radiation protection.

Kv: kilo voltage

mA: milli ampere.

NA: not available.

NRPB: national radiological protection board.

Nejm: new England journal of medicine

Pt: patient.

QC: quality control.

Sv: severt.

SNR: signal to noise ratio.

TLD: thermoluminescent dosimeter.

UK: United Kingdom.

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