

# الآية

وَلْيَعْلَمَ الَّذِينَ أُوتُوا الْعِلْمَ أَنَّهُ الْحَقُّ مِنْ رَبِّكَ  
فَيُؤْمِنُوا بِهِ فَتُخْبِتَ لَهُ قُلُوبُهُمْ وَإِنَّ اللَّهَ لَهَادِ الَّذِينَ  
آمَنُوا إِلَى صِرَاطٍ مُسْتَقِيمٍ

الآية 54 من سورة الحج

## Dedication

- ❖ *To my mother, who has blessed my life with her care, pity and kindness?*
- ❖ *My father, who was raised in poverty, and after a life spent with full work for us, .*
- ❖ *My family's love, patience, and support were essential to the completion of this research.*
- ❖ *To Modern Medical Center and Anilain Diagnostic Center ...for your support, patience, and understanding ... again.*
- ❖ *To my family specially my uncle Prof. M. Elhassan Ali Shayop, Prof. A.elmoneim M. Ali Artoli and my high school teacher assist to Prof. A.elmoneim Mohammed Adam*
- ❖ *To my medical and nuclear physics family.*

## **Acknowledgments**

Many inputs can be directly traced back to former and present collaborators; some were students for relatively short periods while others stayed with me during many years. As in any family, most of them left searching for their own places, several enjoying successful professional and/or academic lives either in this country or abroad. Their names cannot be listed here but, if they ever run across this research, they will find themselves hidden in its lines. They are specifically recognized in the proper places including also at the respective ends a short biographical note. Prof.A.M.Ali Artoli, one of my dearest former professors at graduate College of Alneelain University, was kind enough to peruse the research also his wise advice and comments. Dr Eltayib Elnorani in (AESC) for his the best analysis program SPSS, teaching, advice and comments. Dr.Hussain Ahmed Hassan for his helpful, advice and very important recommendation.

To all of them send my deep appreciation and recognition. My gratefulness also to all the staffs in (KEH, KADC and M.C.M hospitals) and College of medical Radiological Sciences in Sudan University of Science &Technology for their unlimited helps, a special acknowledgment and a word of sincere friendly thanks. Finally, I must underline the invaluable help of (my brother, my friend, my supervisor and my anything....) Dr. A.elmoneim M, Adam, head master of physics department, college of radiography sciences, Sudan University of Science &Technology.

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## Abstract

The transition from conventional screen-film radiography (SFR) to computed radiography (CR) or digital radiography (DR) can involve an increase in patient radiation doses due to the wide dynamic range of the digital imaging systems, which allows overexposure with no adverse effect on image quality. The current study intends to measure and compare the radiation dose to adult patients during (i) chest X rays (CXR) (ii) lumbar spine (LS) and (iii) others using (i) (FSR), (ii) (CR) and (iii) (DR) and evaluate of patient doses in digital, conventional and computed radiography. Entrance surface doses (ESDs) were calculated from patient exposure parameters using Dos-Cal software for three imaging modalities. A total of 202 patients were studied (115 CXR, 78 LS and 9 others). The mean ESDs were  $1.49 \pm 0.15$  mGy for the AP/LS,  $1.87 \pm 0.13$  mGy for LA/LS and  $0.08 \pm 0.97$  mGy for the CXR in SFR type (A),  $1.77 \pm 0.01$  mGy for the AP/LS,  $4.27 \pm 0.04$  mGy for LA/LS and  $0.07 \pm 0.02$  mGy for the CXR in SFR type (B),  $2.54 \pm 0.05$  mGy for the AP/LS,  $5.39 \pm 0.16$  mGy for LA/LS and  $0.11 \pm 0.01$  for the CXR in CR and  $1.16 \pm 0.44$  for the AP/LS,  $1.72 \pm 0.45$  mGy for LA/LS,  $0.06 \pm 0.04$  mGy for the CXR and  $0.2 \pm 0.13$  mGy for other in DR. The radiation dose in this study showed wide differences in terms of dose, exposure factors and inter-examiners. AP LS patient dose in DR (16.67%) was lower than other two imaging modalities where SFR type (A) (21.41%) was lower than (B) (25.43%), CR (36.49) dose values were higher than the other two modalities. Lateral LS patient dose in DR (12.98%) was lower than other two imaging modalities where SFR type (A) (14.11%) were lower than (B) (32.23%) and, CR (40.68%) dose values were higher than the other two modalities. Chest patient dose in DR (18.75%) were lower than other two imaging modalities where SFR type (A) (25%), type B (21.88%) and CR (34.38%) dose values were higher than the other two modalities. LS patient dose values were lower than the majority of the previous studies in all modalities and so CXR doses were lower than previous studies. Radiation dose optimization is crucial for further dose reduction.

## ملخص البحث:

تطور التصوير الاشعاعي العادي للتصوير عبر الحاسب او التصوير الرقمي تضمن زيادة الجرعات التي تلقاها المريض المعرض للاشعة نسبة للمدى الواسع للتصوير الرقمي وان اي زيادة في التعريض لاتؤدي لتاثير سلبي على جودة الصورة.

في الدراسة الحالية قيست وقورنت الجرعة الاشعاعية للمرضي البالغين الذين تعرضوا للاشعة في الصدر والعمود الفقري القطني بواسطة التقنيات الثلاثة وقد حسبت جرعة الجلد السطحية بواسطة برنامج Dos-Cal وجهاز ال rad-Check لقياس الخرج للاشعة السينية. درس 202 مريض منهم 115 للصدر و 78 للعمود الفقري القطني و9 اخريات فكان متوسط الجرعة  $0.15 \pm 1.49$  ملي غراي للتعريض الامامي -خلفي للعمود الفقري و  $0.13 \pm 1.87$  ملي غراي للجانب من العمود الفقري و  $0.97 \pm 0.08$  ملي غراي للصدر في جهاز الاشعة العادية نوع (أ) وكانت  $0.01 \pm 1.77$  ملي غراي للتعريض الامامي -خلفي للعمود الفقري ،  $0.04 \pm 4.27$  ملي غراي للجانب من العمود الفقري و  $0.02 \pm 0.07$  ملي غراي للصدر في جهاز الاشعة العادية نوع (ب) وكانت  $0.05 \pm 2.54$  ملي غراي للتعريض الامامي -خلفي للعمود الفقري ،  $0.16 \pm 5.39$  ملي غراي للجانب من العمود الفقري ،  $0.01 \pm 0.11$  ملي غراي للصدر في جهاز التصوير المحوسب وكانت  $0.44 \pm 1.16$  ملي غراي للتعريض الامامي -خلفي للعمود الفقري ،  $0.45 \pm 1.72$  ملي غراي للجانب من العمود الفقري ،  $0.04 \pm 0.06$  ملي غراي للصدر و  $0.13 \pm 0.2$  ملي غراي لاختبار في جهاز التصوير الرقمي . وضحت الدراسة الفرق الشاسع في الجرعة ،عوامل التعريض و بعض الفحوصات فكانت الجرعة الاشعاعية في الاسرطاط الامامي- خلفي للعمود الفقري القطني في جهاز الاشعة الرقمية (16.67%) أقل من النماذج الاخرى وكان التصوير العادي نوع (أ) 21.41% أقل من نوع (ب) 25.43% وكان التصوير المحوسب (36.49%) اعلى من نموذجي التصوير الاخرين، التصوير الجانبي للعمود الفقري القطني اقل جرعة في التصوير الرقمي (12.98%) أقل من التقنيات الاخرى وكان في نوع (أ) 14.11% أقل من (ب) 32.23% وكان التصوير المحوسب (40.68%) اعلى من الانظمة الاخرى .في تصوير الصدر كان التصوير الرقمي ( 18.75%) اقل من التقنيات الاخرى حيث في (أ) 25% وفي (ب) 21.88% والتصوير المحوسب (34.38%) اعلى من التقنيات الاخرى في تصوير الصدر اقل جرعة في النظام الرقمي واعلى جرعة في الاشعة المحوسبة مقارنة بالتقنيات الاخرى.

التصوير للعمود الفقري القطني لهذه الدراسة اقل جرعة من معظم الدراسات السابقة وكذلك اشعة الصدر . موازنة الجرع الاشعاعية مهمة لتقليل الجرع التي يتعرض لها المريض.