

FORWARD

This dissertation which is entitle “High Resolution CT (HRCT) Effectiveness in Pulmonary Disease Detection, Compared to the Plain Chest X-ray” is submitted in partial fulfillment for the award of the M.Sc. Degree in Radiographic Science. The work addresses and presents a discussion of a comparative study of some most common lung (pulmonary) pathologies’ findings obtained using two known x-ray radiation modalities (the conventional plain x-ray apparatus, and the recently introduced advanced HRCT unit).

Advantages of using the HRCT system as a reliable and effective diagnostic tool for the detection of lung disease as compared to plain x-ray filming using conventional apparatus is discussed. This is with particular emphasis on the impact of the HRCT system on elucidating some of the most common pathologies usually not visible or escaped detection on ordinary plain PA and lateral films. A table of comparative positive and negative findings is given for both systems. Data for anonymous patients were collected from computer network as patient’s reports and were analyzed after discussion with a board of three recognized radiologists and referring physicians.

This dissertation is submitted to the Faculty of Higher Studies, Sudan University for Science and Technology - Khartoum, in collaboration with The Afro-Asian Institute of Medical Sciences (AAIMS) through The Ashbilia Institute, Riyadh, K.S.A., Dr. Gilani is a project supervisor.

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Approved: July 30, 2006

DEDICATION

To my dearly husband for his efforts, patience,
support and understanding through out the
period of my research, and my lovely children:
Ahmed and Nora.

ACKNOWLEDGEMENT

I would like to offer my thanks and gratitude to my supervisor, Dr. Gilani, Dean of the Institute of Afro-Asian Medical Sciences, who had kindly supervised this dissertation and had shown every encouragement and support during the preliminary and final set-up of the work. My thanks are also due to Mr. Abdelmoniem Musa, Asst. Professor of Physics at the Department of Radiological Sciences, College of Applied Medical Sciences, King Saud University, Riyadh, who had presented me with every possible full-handed support and laid his knowledge at my disposal which had, undoubtedly, largely helped in bringing this work to the open.

My thanks are also extended to the staff of King Khalid Hospital's Radiology Department, particularly, the C.T. scan facility personnel, to the other hospital personnel who had kindly helped in offering technical support and provided vital computer network CT patient's data and image interpretations.

I would also like to thank radiologists, chest physicians and surgeons and all other radiographic technologists who had provided me with valuable conventional plain chest and CT chest images.

Thank you,
Kawthar Hassan Abdelgadir

2006

ABSTRACT

The role of both conventional Computerized Tomography (CT) and High Resolution Computerized Tomography (HRCT) cannot be obviated and universally accepted modalities in the precise diagnosis and management of pulmonary disease. This work addresses and presents results of a comparative differential report studies of plain (PA) and (Lateral) chest x-ray films versus findings on HRCT images stored in a computer system for 17 (seventeen) anonymous patient's chest cases randomly selected. Most of the patients were pathologically proven for positive chest ailments, while some were proven through follow-up and clinical lab investigations.

Data for these patients, presented as x-ray images reports, were collected from the computer network at King Khalid University Hospital (KKUH) in Riyadh, K.S.A. and analyzed/compared with the help of a board of three recognized radiologists and referring chest physicians after thorough discussion.

Data analyses results of the study were finally tabulated for comparative positive and negative findings with reference to the particular patient's signs and symptoms and the provisional clinical pathological diagnosis. Results showed that in a total of 17 study cases,

more than 12 negative findings (No Abnormality Detected, *N.A.D*) were obtained from the plain PA and lateral x-ray chest making a (70%) of all the cases under study and as contrasted to almost a (100%) positive findings of chest pathologies as obtained by the HRCT unit, for the same group of patients using the same board of 3-man radiologists.

Tabulated results quoted from patients' reports of interpretation had also shown a more elaborate (detailed) description and reporting of more positive results and few *N.A.Ds* for chest disease findings using the HRCT unit in contrast to many negative results obtained using the plain conventional PA/lateral chest imaging units. HRCT showed particular success in ruling-out certain pathologies to a greater extent.

Despite the huge financial cost of HRCT systems, their benefits in detecting these certain chest pathologies usually missed in conventional units, for outweigh any financial burdens. It must be the method of choice for imaging diffuse lung disease and focal lung lesions and obtain accurate measurements for a solitary pulmonary nodule or mass.

In contrast to plain radiographs, HRCT has greater and specify, and allows a more accurate diagnosis to be obtain.

It is of greater benefit to patient with a suspected chronic infiltrative lung disease.

الملخص العربي

لا يمكن تجاهل الدور الهام من أسلوب التصوير الإشعاعي باستخدام الحاسب (CT) والتصوير الإشعاعي عالي الدقة (HRCT) كنموذجين مقبولين دولياً للتشخيص الدقيق ومتابعة الأمراض الرئوية . يقدم هذا العمل نتائج دراسات تقارير المقارنة بين الصور الإشعاعية المبسطة (PA) والجانبية للصدر وبين صور التصوير الإشعاعي عالي الدقة (HRCT) المخزنة في الحاسب , لعدد (17) حالة لمرضى الصدر اختيرت عشوائياً . معظم هؤلاء المرضى قد ثبتت إكلينيكيًا أنهم يعانون من مرض في الصدر , وبعضهم قد ثبت ذلك من خلال المتابعة والفحوصات الطبية .

تم تجميع بيانات هؤلاء المرضى – المتمثلة في تقارير صور إشعاعية – من شبكة الحاسب الآلي بمستشفى الملك خالد الجامعي (KKUH) في الرياض , المملكة العربية السعودية . وم تحليلها ومقارنتها بعد مناقشة شاملة بمساعدة لجنة من ثلاثة أخصائي أشعة معروفين وأطباء صدرية .

ثم قام الباحث بوضع نتائج تحليل البيانات في جداول من أجل مقارنة النتائج الإيجابية والسلبية بالإشارة إلى أعراض وعلامات مريض معين و إلى التشخيص المرضى الإكلينيكي الأولي . أشارت النتائج أي أن أكثر من 12 حالة من الحالات المرضية الغجمالية ال (17) موضوع الدراسة , كانت سلبية (لا توجد حالات غير طبيعية من N.A.D) نتيجة للفحص بالصور الإشعاعية المبسطة (PA) والجانبية للصدر – أي (17%) من الحالات موضوع الدراسة . بينما أثبتت صور التصوير الإشعاعي عالي الدقة (HRCT) أنه ما يقارب (100 %) من الحالات إيجابية , لنفس مجموعة المرضى والذين تم تصويرهم من قبل نفس اللجنة الثلاثية من أخصائي الأشعة .

كما بينت جداول النتائج المأخوذة من تقارير المرضى أن وصف نتائج الفحوصات باستخدام التصوير الإشعاعي عالي الدقة (HRCT) أكثر تفصيلاً وإيضاحاً عن المرض مقارنة مع العديد من النتائج السلبية التي تمت باستخدام الصور الإشعاعية التقليدية المبسطة (PA) والجانبية للصدر . كما نجحت الفحوصات باستخدام التصوير الإشعاعي عالي الدقة (HRCT) نجاحاً خاصاً في اكتشاف أمراض معينة لقدر كبير .

بالرغم من التكلفة المالية لانظمة التصوير الإشعاعي عالي الدقة (HRCT) , إلا أن فوائدها في اكتشاف أمراض صدر معينة – والتي لا تكتشف عادة باستخدام وحدات

التصوير الإشعاعي التقليدي – أكبر بكثير من الفارق المادي . فينبغي أن تكون طريقة اختيار نظام التصوير للسيطرة على أمراض الرئة و آفاتها والحصول على مقاييس دقيقة للأورام الرئوية المعزولة .

بالمقارنة مع التصوير المبسط (التقليدي) فإن التصوير الإشعاعي عالي الدقة (HRCT) يمتاز بالعديد من الفوائد , ويتيح إمكانية الحصول على تشخيص أكثر دقة .

فهو ذو فائدة لمن يعانون من الأمراض الصدرية المزمنة والمتغلغلة .

CONTENTS

	<u>Pag</u>
	<u>e</u>
FORWARD	I
.....	
DEDICATION	II
.....	
ACKNOWLEDGEMENT	III
.....	
ABSTRACT	IV
.....	
ABSTRACT ARABIC	VI
.....	
CHAPTER I	
INTRODUCTION & OBJECTIVES	1
.....	
INTRODUCTION	2
.....	
1.1 Objective of the study	3
.....	
1.2 Hypothesis	4
.....	
1.3 Methodology	4

.....			
1.3.1	Data	Source	4
.....			
1.3.2	Data Collection	and Reading	4
.....			
1.4	Area	of the study	4
.....			
CHAPTER II			
LITERATURE	REVIEW	.....	5
.....			
TOMOGRAPHIC		EQUIPMENT	6
.....			
2.1	Nature and Production	of X-Rays	6
.....			
2.2	The Conventional X-ray Apparatus (mobile,		8
	500mA)		
2.3	Conventional Computerized Tomographic		9
	(CT) Units		
2.3.1		Introduction	9
.....			
2.4	Conventional Tomographic	Equipment	9
.....			
			<u>Pag</u>
			<u>e</u>
2.4.1		Introduction	9
.....			
2.5	Computed Tomographic	Equipment	11
.....			
2.5.1		Introduction	11
.....			

2.6	Equipment for Conventional CT	13
2.7	Criteria for assessing CT images	14
2.8	Advantage of CT compared to conventional (plain) radiography	14
2.9	Disadvantage of CT compared to conventional (plain) radiography	14
2.10	The High Resolution CT (HRCT) System	15
2.10.1	Introduction	15
2.10.2	Clinical indications	16
2.10.3	Role of HRCT in Diffuse Interstitial Disease	16
2.11	The External Anatomy of the Chest	19
2.12	The Internal Anatomy of the Chest	19
2.13	The Trachea	20
2.14	The Bronchi (Right and Left)	20
2.15	The Lung	20
2.16	The Blood Supply of the Lungs	22
2.17	The nerve supply to the lungs	22

2.18	Mediastinum	22
.....		
2.18.1	The heart	23
.....		
2.18.2	Great vessels	23
.....		
2.18.3	Trachea and esophagus	23
.....		
2.18.4	Thymus gland	24
.....		

		<u>Pag</u>
		<u>e</u>
2.19	Physiology of the Chest	24
.....		
2.19.1	The heart	24
.....		
2.19.2	The function of the heart	25
.....		
2.19.3	The mechanics of respiration	26
.....		
2.19.3.1	Quiet inspiration	27
.....		
2.19.3.2	Forced inspiration	27
.....		
2.19.3.3	Lung change on inspiration	27
.....		
2.19.3.4	Quiet expiration	28
.....		
2.19.3.5	Forced expiration	28
.....		
2.19.3.6	Lung change on expiration	28

2.19.4	..... Types of respiration	29
2.19.4.1	..... Abdominal type of respiration	29
2.19.4.2	..... Thoracic type of respiration	29
2.20	..... Pathology of the Chest	30
2.20.1	..... Bronchitis	30
2.20.1.1	..... Acute bronchitis	30
2.20.1.2	..... Chronic bronchitis	30
2.20.2	..... Obstruction of bronchi	31
2.20.3	..... Bronchial asthma	31
2.20.4	..... Bronchiectasis	31
2.20.5	..... Tumors	31
2.20.6	..... Pneumonia	32
2.20.7	..... Tuberculosis	33
2.20.8	..... Pleura	34
2.20.8.1	..... Hydrothorax	34
	

	<u>Pag</u> <u>e</u>
2.20.8.2 Hemothorax	34
2.20.8.3 Pneumothroax	34
2.20.8.4 Pleurisy	35
2.20.8.5 Tumors	35
2.20.9 Mediastimum	35
2.20.9.1 Cysts	36
CHAPTER III	37
MATERIALS & METHODS	38
CHEST PROTOCOL	39
ROUTINE CHEST CT	39
CHAPTER IV	41
RESULTS, ANALYSIS & DISCUSSION	42
4.1 Introduction	42
4.2 Selected chest pathologies data	42
Comparison between C.T and Conventional X-ray	45

Image

CHAPTER V 49

.....
CONCLUSION 50

.....
CHAPTER VI
APPENDIX 51

.....
ABBREVIATIONS 52

.....
BIBLIOGRAPHY 53

.....
REFERENCES 54

.....