

بسم الله الرحمن الرحيم

Sudan University of Science and Technology
College of Graduate Studies

College of Medical Radiological Sciences
Department of Diagnostic Radiological Technology

Studying of shoulder pain using MRI

دراسة آلام الكتف باستخدام تقنية الرنين المغنطيسي

**Thesis submitted for partial fulfillment of
Requirement of the d M.Sc. in Diagnostic Radiological
Technology**

By

Faisal Elamin Eldirdairi Mohamed

Supervisor

Dr. Asma Ibrahim Ahmed

Assistant Professor

September 2012

الايه:

قال تعالى (أتى أمر الله فلا تستعجلوه سبحانه وتعالى عما يشركون (1)
ينزل الملائكة بالروح من أمره على من يشاء من عباده أن أنذروا انه لا اله إلا
أنا فاتقون (2) خلق السموات والأرض بالحق تعالى عما يشركون (3) خلق
(الإنسان من نطفه فإذا هو خصيم مبين (4)

صدق الله العظيم

النحل

Dedication

To.....

My family

My teachers

My friends

My colleagues

Acknowledgment

Firstly I thanks my God for his help to finish this work

Successfully .

I would like to express my deepest gratitude dedication to

My supervisor Dr.Asma Ibrahim Ahmed for her guidance.

I also need to thank for all people to finish this work.

III

Contents

No.	Item	Page No.
	Dedication.....	II
	Acknowledgements	III
	Contents.....	IV
	List of tables	IX
	List of figures	X
	Abstract [English]	XII
	Abstract [Arabic]	XIII
	Abbreviation	6

IV

Chapter One: Introduction

1.1 Historical background

.....

1.2 Problem of the study

1.3 Objective of the study

1-4 Significance of the study

1-5 over view of the study

Chapter tow: Literature Review

2-1 Anatomy

2-1-1 Bony structure

2-1-2 Scapula

2-1-3 Humerus

2-1-4 Clavicle

2-1-2 Soft tissue of shoulder joint

2-1-2-1 The deep fascia

2-1-2-2 The Deltoid muscle

2-1-2-3 Subscapularis muscle

2-1-2-4 Supraspinatus muscle

2-1-2-4 Infraspinatus muscle

2-1-2-5 Teres minor muscle

- 2-1-2-6 Teres Major
- 2-1-2-7 Biceps Bjrachialis muscle
- 2-1-2-8 The pectoralis major muscles
- 2-1-2-9 The pectoralis minor muscles
- 2-2 Muscle physiology
 - 2-2-1 Contraction of muscle
 - 2-2-2 Simple muscles twitch
 - 2-2-3 Summation of contraction
 - 2-2-5 The events in muscle contraction
 - 2-2-6 The Deltoid muscle
 - 2-2-7 Subscapularis muscle
 - 2-2-8 Supraspinatus muscle
 - 2-2-9 Infraspinatus muscle
 - 2-2-10 Teres minor muscle
 - 2-2-11 Biceps Bjrachialis muscle
- 2-3 Pathology
 - 2-3-1 Shoulder pain
 - 2-3-2 humeral head fractures
 - 2-3-3 Lesser tuberosity fractures
 - 2-3-4 Rotator cuff tendinitis

2-3-5: Dislocated shoulder Injury

2-3-6: Rotator cuff calcific Tendonitis injury

2-3-7: Broken Collar bone Injury

2-3-8 Rotator cuff tear

2-4 Modalities shoulder joint Diagnosis

2-4-1 Plain radiographs(X-ray)

2-4-2 Computed tomography(CT)

2-4-3Ultrasound (US)

2-4-4 magnetic resonance imaging (MRI)

2-5 History of Magnetic Resonance imaging (MRI)

2-6 How M.R.I Works

2-7 Previous studies

Chapter Three: Material and Methods

3.1.1. Patients

3.2: Study Equipment

3.2.1 MRI machine

3.3 Technique

3.3.1 Scan method

3.3.2 Alamal diagnostic center

3.3.3 Modren medical center

3.4 Method of evaluation

3.5 Method of Data analysis

Chapter four : Results

Results

Chapter five: Discussion

5.1. Discussion

5 . 2 Conclusion

5.3 Recommendations

References

Appendix A

List of tables

Table	Item	Page
NO		
4 -1	distribution of patient gender	
4-2	patients age distribution	

- 4-3 patients weight distribution
- 4-4 patients work
- 4-5 Show the most common finding of shoulder pain in Relation to frequency.
- 4-6 Show the diagnosis * work cross tabulation.
- 4-7 Show the diagnosis * gender cross tabulation.

List of figures

Figure	Item	Page
		NO
2-1	anatomy of the shoulder	
2-2	scapula , posterior aspect and lateral	
2-3	shoulder muscle	
2-4	shoulder tendons and ligaments	
2-5	show plain radiography shoulder joint	
2-6	show computed tomography shoulder joint	
2-7	show ultrasound shoulder joint	
2-8	show magnetic resonance imaging shoulder joint	
3- 1	MRI machine was used in the study	
3- 2	MRI coil was used in the study	
4 -1	distribution of patient gender	
4-2	patient's age distribution	
4-3	patients weight distribution	
4-4	patients work	
4-5	Show the most common finding of shoulder pain in Relation to frequency	

Abstract:

This study carried out in the Alamal diagnostic center and Modern Medical center in Khartoum state which equipped by high quality machine among them MRI Philips 1.5 tesla and GE 1.5 tesla for Modern medical center.

A total of 50 patients for this study , almost all them complaining of persistent shoulder pain , most of them were under gone routine plain shoulder radiographs.

More than 41%(30) of patient showed evidences of rotator cuff tear of different grades ,that would not be seen in radiography ,most of them were elder patient, explaining that elder population are susceptible to cuff tears , and at high risk and occurrence of the shoulder pain increase with age and hard work and weight .

The study verified that MRI the best to demonstrate soft tissue with high quality diagnostic The persistent shoulder pain is recommended to be routine examination. and the exam must be done by well trained technologist who is familiar with the scan protocols to give full diagnosable image.

مستخلص البحث:

اجريت هذه الدراسة بالمركز التشخيصى لمستشفى الامل الوطنى والمركز الطبى الحديث حيث يوجد بهما جهازى رنين مغنطيسى ذو كفاءة عالية 1.5 تسلا

أجريت هذه الدراسة على 50 مريضا اغلبهم يعانون من ألام مزمنة فى الكتف وكانت أعمارهم تتراوح بين 25-70 عاما وأجريت لهم فحوصات أشعة روتينية سابقة

كما كان متوقعا فان النتائج كانت مرضية ومطابقة لما فى معظم الدراسات السابقة حيث أوضحت فحوصات الرنين المغنطيسي أكثر من 41% من العدد الكلى يعانون من تمزقات فى اربطه عضلات الكتف والتي لم تكن واضحة فى الأشعة الروتينية كما أوضحت ان المرضى الذين يعانون من الوزن الزائد والمرضى كبار السن والمرضى الذين يعملون أعمال شاقة . معرضون اكثر من غيرهم للآم الكتف

اوضحت هذه الدراسة ان فحوصات الرنين المغنطيسي ذات دقة عالية لتشخيص العضلات .والأنسجة المحيطة للكتف

ونسبة لهذه المميزات اقترح الباحث تفعيل دور هذه الوسيلة وجعلها أساسية وتدريب الكوادر العاملة فى هذا المجال من أخصائي واختصاصي الأشعة

Abbreviations

MRI
imaging

Magnetic resonance

C3
segment

Third cervical nerve

C4
segment

Fourth cervical nerve

C5 segment	Fifth cervical nerve
C7 segment	Sixth cervical nerve
GT	Greater tuberosity
LHB	Long head of biceps
T1	Inversion time
PD	proton density
SE	Spin echo
FSE	Fast spin echo
FOV	Field of view
CT	Computed Tomography
US	Ultra Sound
Hrs	HOURS

