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Diagnostic Value of Ultrasonography: In Evaluation Of Shoulder Impingement Syndrome

Essay

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Abstract

In post-operative rotator cuff with metal insertion and the magnetic effect of the MRI field was to some extent, problematic, however the use of inert (non Ferro-magnetic materials) was a good option ,General speaking, the post operative findings for the rotator cuff in MRI and US are questionable and quiet difficult due to degradation of the examination quality by the metallic artifact in MRI and on the other hand , distorted anatomical landmarks which are the key points in ultrasonography.

Being an available, widely spread, fast and non invasive technique for the assessment of musculoskeletal disorders including evaluation of the shoulder joint. High resolution ultrasonography has gained increasing popularity as a diagnostic tool for musculoskeletal assessment.

Technical development, increased experience ,detailed knowledge of shoulder anatomy and pathologic conditions ,awareness of different Sonographic pitfalls ,limitations and artifacts have significantly improved the sonographic results in shoulder assessment.

Key words;

List of the Contents

Page number

List of Abbreviations

Acromiohumeral distance----------AHD

Augmented reality ----------AR

Computed tomography ----------CT

Two and three dimensions---------- 2D &3D

Full thickness tear ----------FTT

Mega hertz ----------MHz

Maximum intensity projection ----------MIP

Multiplanar reconstruction ---------- -MPR

Magnetic resonance imaging ----------MRI

Partial thickness tear----------PTT

Rotator interval----------RI

Shoulder impingement syndrome ----------SIS

Ultrasonography ----------US

Virtual endoscope----------VE

Volume rendering---------- VR

List of figures

LIST OF TABLES

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INTRODUCTION:

The basis of the shoulder impingement syndrome is the restricted space that exists between the coracohumeral arch above ,the humeral head and the tuberosities below. Through this space pass the tendons of the rotator cuff **(*Nathalie. et al 2006.)***

*S*ub acromial impingement syndrome is a clinical entity that was proposed by ***Neer in 1972***.this syndrome is a result of chronic irritation of the supraspinatus tendon against the undersurface of the anterior third of the acromion ,the coraco -acromial ligament and the acromio clavicular joint, it is often difficult to diagnose because the clinical presentation may be confusing and clinical tasks lack specificity ***(Biglini and Levine ,1997).***

MRI was considered to be a reliable technique for the evaluation of the rotator cuff tendons ,but it provides a static evaluation of the shoulder joint and can only indirectly suggest the diagnosis of subacromial impingement ,because most findings are non specific ***(Nathalie et al .,2006)***

Studies have investigated the value of dynamic MR evaluation of the shoulder with open MRI .the major limiting factors of dynamic MRI are the restricted availability of open magnets and the fact that the MR technology only allows sequential imaging of single – plane shoulder motions that don't entirely Reproduce physiologic shoulder motion ***(Natalic et al .,2006)***

Large number of factors could cause shoulder impingement syndrome. The are divided into two major groups: structural factors

(related to the acromion, acromio clavicular joint, coracoid process, bursa ,humerus and rotator cuff) and functional factors ***(Ditsosis K et al ., 2003)***

Pathogeneses of shoulder impingement: with the arm in the neutral position, the supraspinatus tendon and tendon of the long head of biceps brachii muscle lie anterior to the acromion ,acromio-clavicular joint and coraco-humeral ligament ***(Biglini and Levine ,1997).***

Being an available, widely spread, fast and non invasive technique for the assessment of musculoskeletal disorders including evaluation of the shoulder joint . High resolution ultrasonography has gained increasing popularity as a diagnostic tool for musculoskeletal assessment ***(Melanie et al .,2005)***

Technical development and improvement ,increased experience ,detailed knowledge of shoulder anatomy and pathologic conditions ,awareness of different Sonographic pitfalls ,limitations and artifacts have significantly improved the sonographic results in shoulder assessment***(Mathieu et al., 2006)***

Aim of work*:*

The purpose of this study is to evaluate the role of dynamic high resolution ultrasonography in the detection of subacromial impingement syndrome and to find out the value added by dynamic ultrasonography to the static examination of such cases.

In the developing countries ,the cost /effectiveness is very important issue in the evaluation of any diagnostic examination ,so we have a goal to offer an accurate and highly sensitive diagnostic method for the cases of shoulder impingement syndrome, being widely spread and of low cost .

MUSCLES OF THE SHOULDER

1- DELTOID (FIG 1)

The largest and the most important of the glenohumeral muscles is the deltoid ,it consists of three parts ,the anterior deltoid ,the middle portion ,and the posterior deltoid ,Elevation in the subscapularis plane is the role of the anterior and middle portions with some actions by the posterior parts especially above 90 degrees .Flexion is the role of the anterior and middle parts of the muscle and the clavicular portions of the pectoralis major ,with some contributions by the biceps .Abduction in the coronal plane is mainly by the action of the posterior portion of the muscle ***(Williams and Dyson,2000).***

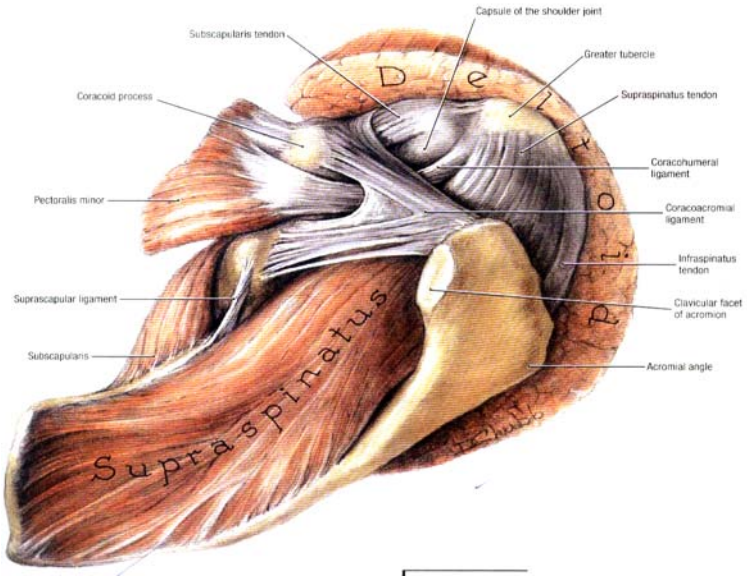
2-**THE ROTATOR CUFF** (FIG 2,3&4)

The rotator cuff is generally defined as a complex of four muscles that arise from the scapula and attach to the tuberosities of the humerus .along with the adjacent capsule that blends with these tendons near their insertions. The muscles of the rotator cuff include the subscapularis, supraspinatus, infraspinatus and teres minor muscles arranged in the sagittal image as well as in the corresponding projectional image in figures ***(Williams and Dyson,2000).***

A] **The supraspinatus muscle (FIG1,2,3&4)**

The supraspinatus muscle arises from the medial two thirds of the supraspinatus fossa of the scapula and from the strong supraspinatus fascia .the muscle forms a tendon ,which passes under the acromion and inserts in the highest facet in the greater tubercle of the humerus as it approaches its insertion ,many fibers are fused with the capsule of the shoulder joint .Its

tendinious insertion is in common posteriorly ,with the infraspinatus tendon and anteriorly,with the coracohumeral ligaments.



Figure(1)graphic image of a superior view of the supraspinatus muscle and shoulder ligaments***(Williams& Dyson, 2000)***

B] **<u>The Infraspinatus Muscle (FIG 2,3</u>**&4)

The infraspinatus arises from the medial two thirds of the infraspinatus fossa .The superficial fibers from the infraspinatus fascial covering the muscle the tendon of the muscle inserts in the middle facet of the of the greater facet of the humerus as it crosses the capsule of the shoulder joint some of the fibers blend with the capsule .The tendon is in common anteroposteriorly with the supraspinatus tendon and inferiorly with the teres minor tendon

<u>C] The Subscapularis Muscle</u> (FIG. 2,3,4&5)

It is the anterior portion of the rotator cuff .It arises from the subscapularis fossa it is a large powerful muscle that inserts in the lesser tubercle of the humerus, some fibers blend with the capsule of the shoulder joint, some fibers are sometimes found passing in the intertubercular sulcus ***(Holder et al , 2000)***