

# ROLE OF ULTRASOUND TEST IN DIAGNOSIS OF CLINICALLY SUSPECTED ROTATOR CUFF TEAR

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## ABSTRACT:

**Background:** shoulder pain is a common problem in different age group, often diagnosed clinically but clinical diagnosis does not give accuracy alone unless to be confirmed by another investigations.

**Objective:** Compare the role of ultrasound test in diagnosis of Rotator cuff tear with those clinically suspected patients.

**Patient and Method:** The study started from 2008-2010. Thirty-three patients with shoulder pain were included in the study. The study is a prospective study was done in Al-Yermouk teaching hospital.

**Results:** Complete tear is diagnosed clinically and Ultrasound study is useful to prove the diagnosis with sensitivity of (87.5%). Partial tear is diagnosed mainly clinically and Ultrasound study is not so useful in the diagnosis with the sensitivity of (56%) and thus those patients need for further investigations.

**Conclusion:** Ultrasound is non-invasive, safe and gives high percentage of accuracy in diagnosis of Rotator cuff tear.

**Keywords:** Rotator cuff tear, clinical diagnosis, ultrasound.

## Introduction:

The rotator cuff is an anatomical term given to the group of muscles and their tendons that act to stabilize the shoulder. Intrinsic and extrinsic muscles serve as fine tuners of motion and power movers by working in (force couples), when portion of these becomes inoperative, normal shoulder function is compromised and significant dysfunction may result. The rotator cuff stabilizes the glenohumeral joint through force couples in both the coronal and transverse planes. [1,2,3,4,5].

Partial thickness tears is considered to be a definite disruption of the fibers and not simply fraying, roughening or softening of the surface. [6] Full thickness tear is a significant distraction of the fibers, more likely along the junction of Sharpey's fibers and fibers of tendon proper. [7] The etiological factors are divided into:

1- Structural (outlet impingement): [8]

A-Acromion ► Morphology Increase risk with type3

- Degenerative spur.
- Fracture of acromion.

B- Acromioclavicular joint.

C- Coracoid ► Congenital.

- Coracoid fracture or postsurgical change in shape.

2- Vascular etiology. [9]

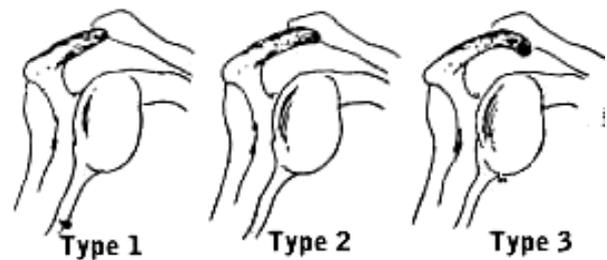


Fig.1 types of acromion

- 3- Trauma: ► Acute high velocity trauma.
- Repetitive low velocity microtrauma [10]
- 4- Instability.
- 5- Intrinsic rotator cuff degeneration.
- 6- Genetic factor. [11]

## Ultrasonography:

The development of high resolution real time ultrasound instruments made its application in the examination of more complex structures such as the shoulder, and most sonographers used a (10-12MHz) scanner to provide the best image. In full-thickness rotator cuff tear there are **Direct signs** of tear which include non-visualization of the supraspinatus tendon and hypoechoic discontinuity of the tendon, whereas **Indirect signs** include the double cortex sign, the sagging peribursal fat sign, compressibility, and muscle atrophy [12]



Fig.6 hypoechoic defect [13]



Fig.7 "double cortex" [14]



Fig.8 "sagging peribursal fat" [14]

While in partial-thickness tears manifest as focal, well-defined hypoechoic or anechoic defects in the tendon but involve only the bursal or articular surface.

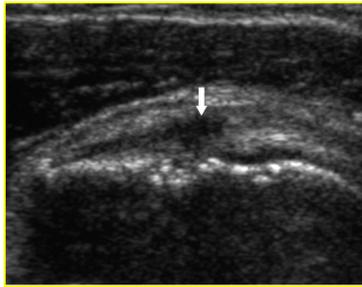


Fig.5 Partial-thickness tear.[14].

Ultrasonography also allows the shoulder to be examined dynamically and provides the opportunity to show the results to the patient in real time. It is also safe with no known risk like radiation and provides the important benefit of practical bilateral examinations (which, although theoretically possible with arthrography, MRI and arthroscopy but usually not done for reasons of cost, risk and time) [13,14]

**Patients and method:**

From February 2008 to September 2010. Thirty three patients with shoulder pain were subjected to a prospective study in Al-Yarmouk Teaching Hospital, 8 patients were found to have full thickness tear (FTT), 25 patients were found to have partial thickness tear (PTT) clinically and those patients underwent ultrasonography (U/S) examination, According to the criteria of (Louis Solomon, David J. Warwick and Selvadurai Nayaga). Whenever we found suggestive history; one or more of the following criteria Shoulder shrug and abduction paradox, positive drop-arm test {Codman’s test} & negative Impingement test. {Neer’s injection test}, we consider the case as full thickness tear, whenever we found:

- 1- Suggestive history.
- 2- Absence of Shoulder shrugs abduction paradox, and drop-arm test {Codman’s test}.
- 3- Presence of one or more of the following criteria:
  - a) Positive Hawkins-Kennedy impingement test.
  - b) Positive Job’s test.
  - c) Positive Neer’s test.
  - d) Positive Impingement test, we consider the case as; partial thickness tear.

All patients were examined with commercially available real time U/S equipment using a 7.5 MHz linear phased array transducer.

Transverse and longitudinal planes were taken, in all patients, comparable images of the opposite shoulder were obtained in order to compare U/S findings and to facilitate detection of subtle abnormalities.

**Results:**

Mean age of patients in general was (49.6) years ranging from (36 to 71) years, with Full thickness tear. Was (57.3) years ranging from (45 to 71) years and in Partial thickness tear. was (47.2) years ranging from (36 to 62) years, regarding sex, 19 males (57.5%) and 14 females (42.4%); with rotator cuff tear. In our study, 72.7% in dominant side while 27.2% in non-dominant side.

Regarding types of tear, 24.2% showing P.T.T while 75.7% showing F.T.T., as in fig.6

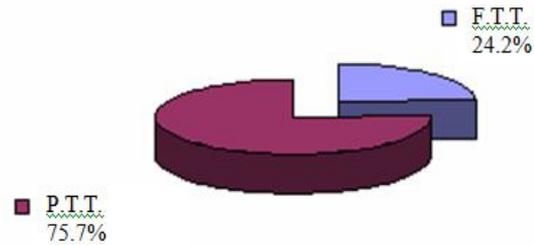
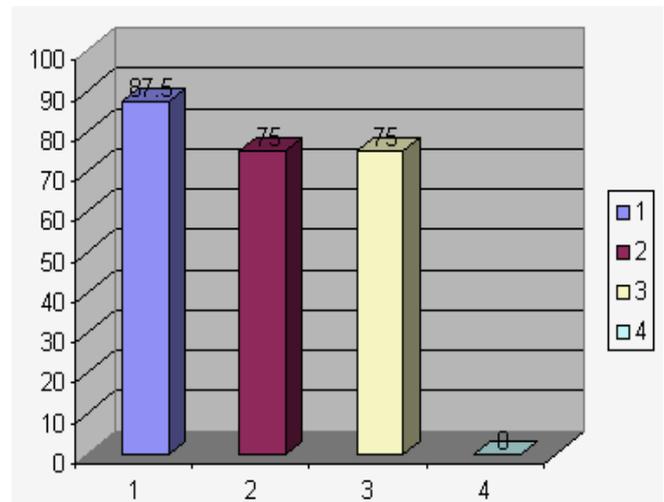


Fig. 6: Percentages of patients with R.C. tear distributed according to the type

**Physical signs:**

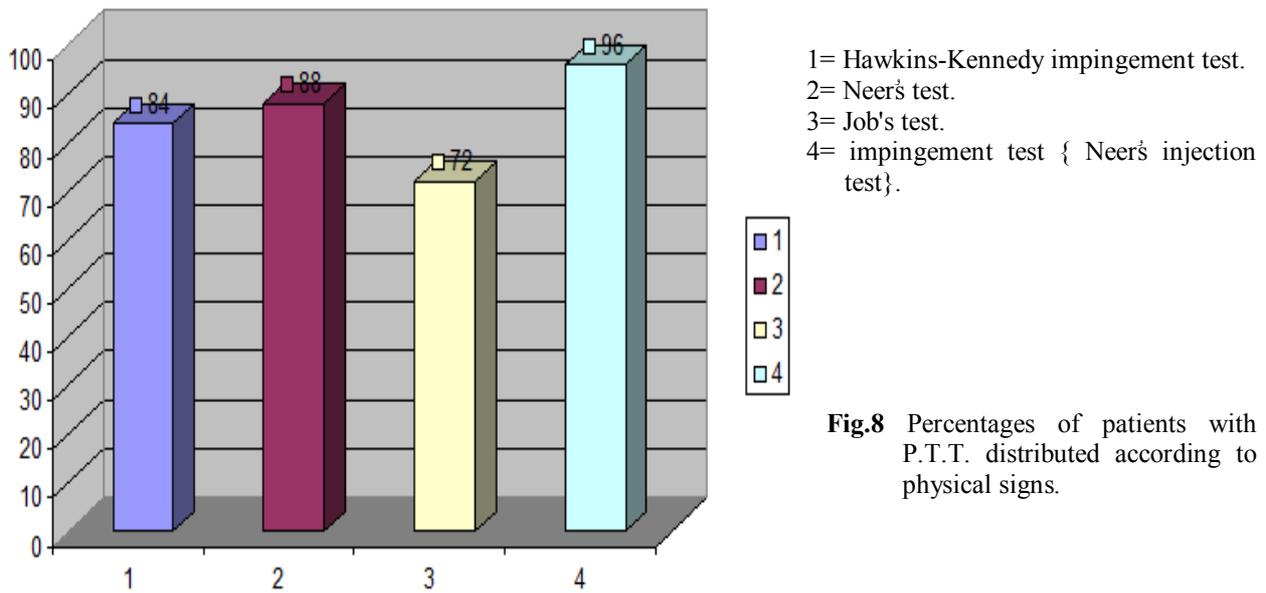
**In F.T.T. (Full Thickness Tear)**



- 1= shoulder shrug and abduction paradox.
- 2= drop arm sign {Codman’s test}.
- 3= painful arc.
- 4= impingement test {Neer’s injection test}.

Fig.7: Percentages of patients with F.T.T. distributed according to physical signs.

**In P.T.T.(Partial Thickness Tear)**



**Fig.8** Percentages of patients with P.T.T. distributed according to physical signs.

**Ultrasonography:**

**Table 1:** comparison of clinical and ultrasonographic diagnosis of rotator cuff tears.

Clinical diagnosis	No. of patients	Ultrasonographic diagnosis		
		F.T.T.	P.T.T.	Intact tendon
F.T.T.	8	7 (87.5%)	1 (12.5%)	----
P.T.T.	25	1 (4%)	14 (56%)	10 (40%)
<b>Total</b>	<b>33</b>	<b>8 (100%)</b>	<b>15(100%)</b>	<b>10(100%)</b>

- Sensitivity of U/S in detection of F.T.T. was {87.5%}.
- Sensitivity of U/S in detection of P.T.T. was {56%}.

**Discussion:**

The total number in our study was 33 patients, (24.2%) of them were having F.T.T. and this complies with Leman, et.al. And (75.7%) were having P.T.T. and this complies with the finding of K. Yamanaka and H. Fukuda. By that the P.T.T. is being the most common tears of the rotator cuff tear.<sup>[15]</sup> Mean age of patients with F.T.T. was 57.3 yrs and this complies with the findings of Gartsman, Khan, and Hammer man, and this confirms that the degenerative process of the rotator cuff is an important factor in rotator cuff pathology. While Mean age of patients with P.T.T. was 47.2 yrs and this is complies with findings of Fukuda, et, al. And this is because that the degenerative process is increase with age and healing will be slower.<sup>[16][17]</sup> Regarding sex, males (57.5%) and females (42.4%). This complies with the findings of Codman and this is probably because males involved in more strenous, active movements and jobs. <sup>[18]</sup> The dominant side was affected in (72.7%) of the patients, the non dominant side was affected in (27.2%) and this complies with findings of Rockwood,et, al, and this obviously due to the

overuse of the dominant side in activities that may predispose to rotator cuff pathology and at the same time is more susceptible to trauma.<sup>[19]</sup> Regarding physical signs, In F.T.T. all patients were having negative impingement test {Neer injection test} In P.T.T {Neer's injection test} was present in (96%) of patients. And this shows that the main cause of weak movement was the pain due to the subacromial lesion, while in F.T.T.no one showed positive {Neer's injection test}and this declared that the main cause of weak movement is the discontinuity of rotator cuff tendon and not due to pain ,and this complies with what Neer described .<sup>[20]</sup> The sensitivity of U/S in detection of F.T.T. is {87.5%}. And {56%} for P.T.T. and this is complies with the findings of K. Takais and K. Makino.<sup>[21]</sup> And this is mean that U/S is a useful test in diagnosis and early detection of F.T.T., and this will help in the management, which is mainly operative especially in active, young patient by determining the size, location, and some time the causes. But U/S is not so useful in the diagnosis of P.T.T. and this is need for more tests to be evaluated, mainly the MRI.<sup>[22]</sup>

**Conclusions & Recommendations:**

- ▶ Rotator cuff tears affect the dominant side in different age group mainly above the age of fourteen, and more common in male.
- ▶ F.T.T. is diagnosed mainly clinically and ultrasonography is useful in the diagnosis with sensitivity of {87.5%}.
- ▶ P.T.T. is diagnosed mainly clinically and ultrasonography is not so useful in the diagnosis with sensitivity of {56%}. And thus those patients need for further evaluation with other test like MRI.
- ▶ U/S is non-invasive, safe with no known risk like radiation, and quick.
- ▶ We recommended that patients with suspicion of P.T.T. need for evaluation of MRI test for diagnosis.

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