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Role Of Ultrasound In Evaluation Of Rotator Cuff And Associated Pathologies In Patients With Shoulder Pain

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Abstract

Background: Rotator cuff injuries are a leading cause of shoulder pain, significantly impacting quality of life and functionality. Ultrasonography (USG) has emerged as an effective, non-invasive, and accessible imaging modality for evaluating shoulder pathologies, particularly rotator cuff disorders.

Objective: To assess the role of ultrasound in detecting rotator cuff and associated shoulder pathologies in symptomatic patients, and to evaluate its diagnostic value compared to conventional modalities.

Methods: A cross-sectional study was conducted over five months in the Radiodiagnosis Department at ASRAM Hospital, Eluru. Fifty patients aged 15–60 years presenting with shoulder pain were evaluated using high-resolution ultrasound. Demographic data, sonographic findings, and lesion characteristics were analyzed statistically.

Results: Among 50 patients, 70% were male and 80% had right-sided shoulder pain. Rotator cuff tears were identified in 50% of cases, with full-thickness tears (60%) being more common than partial-thickness tears (40%). Other findings included rotator cuff tendinitis (20%), degenerative changes (10%), and biceps pathologies. No abnormalities were found in 20% of patients.

Conclusion: High-resolution ultrasound is a reliable and efficient first-line imaging modality for evaluating rotator cuff and related pathologies. It demonstrated strong diagnostic accuracy, especially in full-thickness tears, and plays a critical role in the early diagnosis and management of shoulder pain.

Keywords: Rotator Cuff Tears, Shoulder Ultrasonography, Musculoskeletal Imaging

INTRODUCTION

- Rotator cuff disorders are the leading cause of shoulder pain.
- Rotator cuff disorders, including partial and full tendon tears, degenerative and inflammatory changes, are the primary factors contributing to shoulder symptoms.
- Shoulder USG is consistently used in the assessment of pathologies around shoulder joints and is as accurate as MRI in the detection of rotator cuff tears.
- With recent improvements in transducer strength, image resolution, and operator training, ultrasound (USG) provides an excellent alternative imaging modality for the diagnosis of rotator cuff tears and other associated rotator cuff pathologies.

Types And Subtypes Of Rotator Cuff Tears

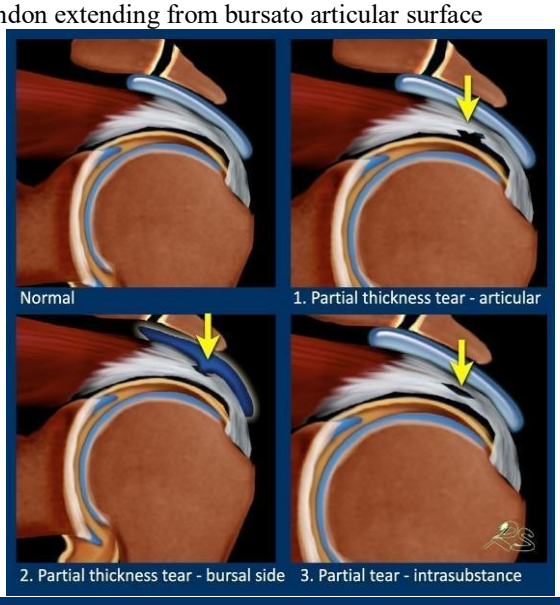
- Supraspinatus tendon tear (most common)
- Infraspinatus tendon tear.
- Subscapularis tendon tear.

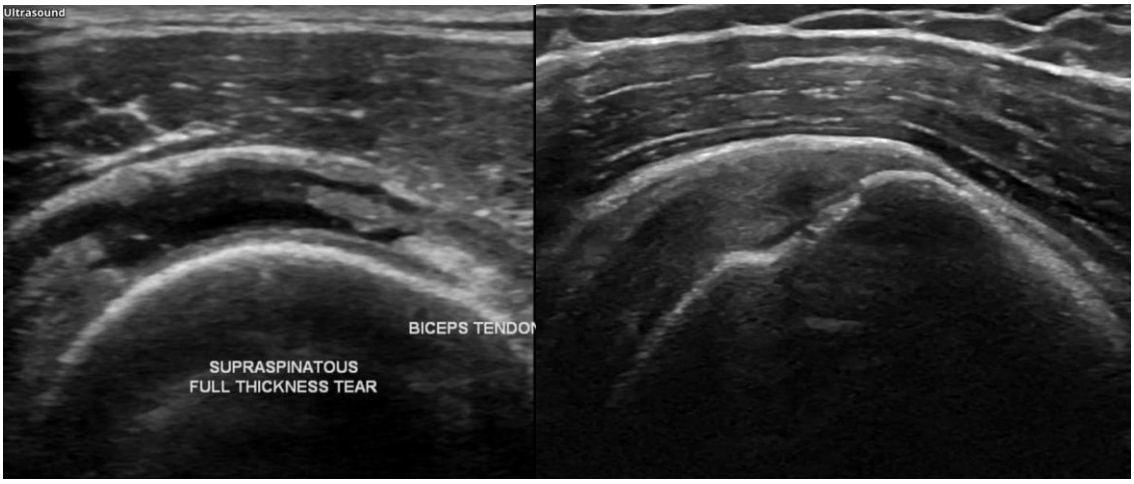
Subtypes

- Full-thickness rotator cuff tear
- Partial-thickness rotator cuff tear
    - intrasubstance tear
    - articular-sided tear
    - bursal-sided tear
- Critical zone tear

Example

- Focal Hypoechoic area in the tendon
- Hypoechoic defect in tendon extending from bursato articular surface





OBJECTIVES

- The study aims to evaluate patients with painful shoulders with ultrasonography as the initial line of imaging technique.
- To establish its role in diagnosing rotator cuff tears and other associated pathologies in symptomatic patients.

Inclusion Criteria: Patients in the age group of 15 to 60 years, visiting the department of Radiodiagnosis with a history of shoulder pain.

Exclusion Criteria: Patients who are asymptomatic and have undergone prior surgeries around the shoulder joint

METHODS AND METHODOLOGY

The study was conducted over 5 months **(February 2023 to August 2023)** in the Department of Radiodiagnosis, ASRAM Hospital, Eluru.

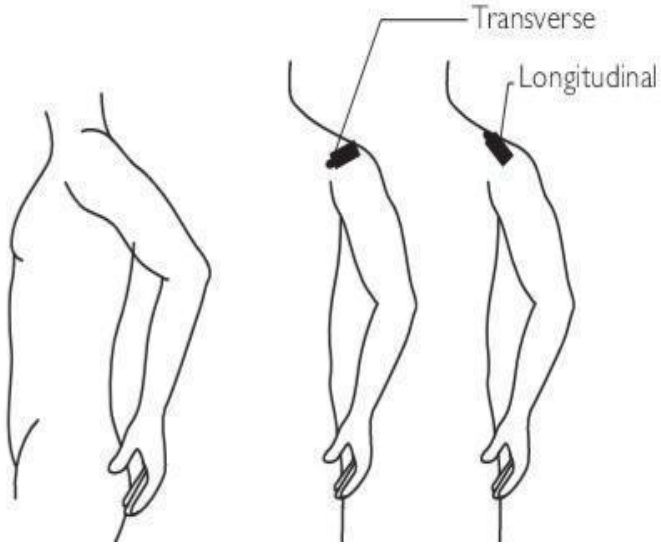
- **Sampling Method:** Convenient sampling
- **Sample Size:** 50 cases
- **Ultrasound Equipment:** Philips Affiniti 70 ultrasound machine
- **Probe:** High-frequency linear probe
- Scans were performed with **different upper limb positions** to examine various rotator cuff muscles.

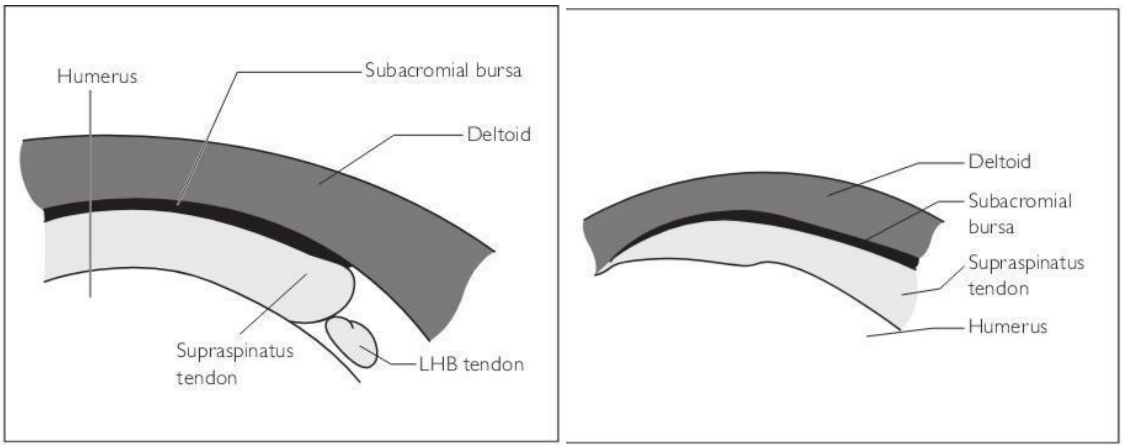
Data Analysis:

Data was entered into Microsoft Excel 2007 and analyzed using **Epi Info version 3.4.1**

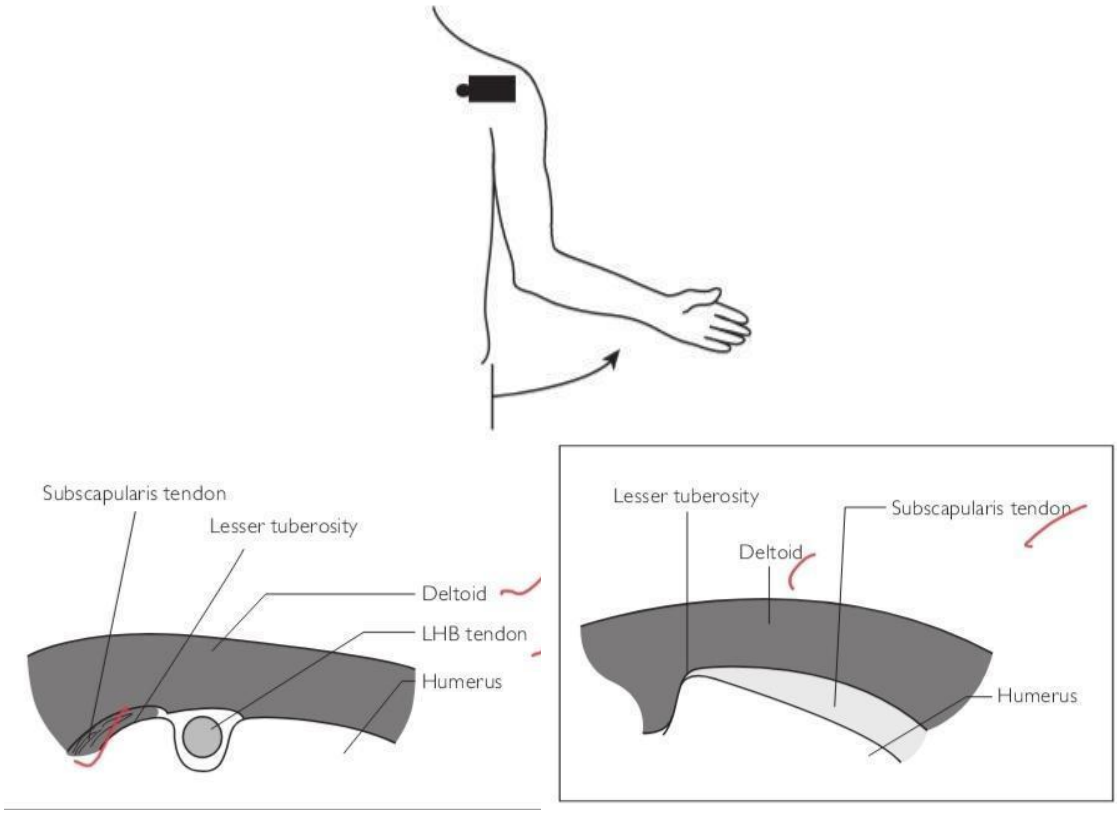
Descriptive statistics such as means, proportions, and percentages were used for demographic data.

Normal probe and patient positioning Suprapinatous

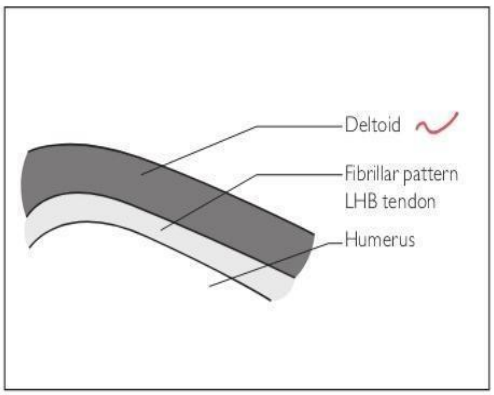


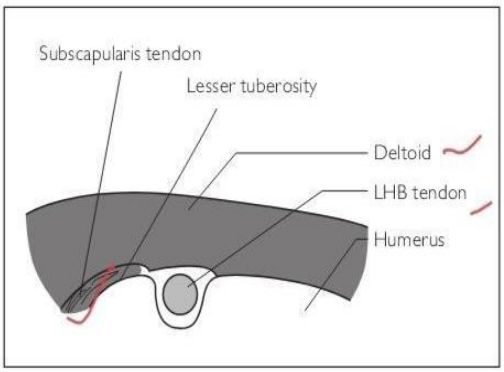


Subscapularis



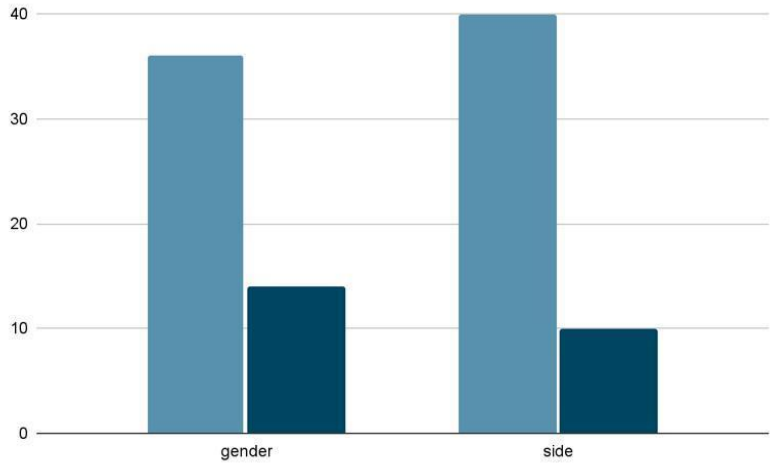
BICEPS TENDON





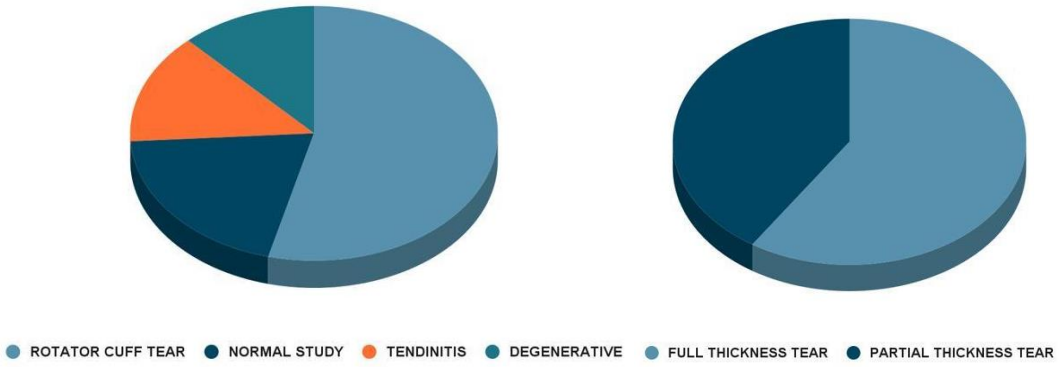
RESULTS

- **Gender Distribution:**
  - Male: 36 cases (70%)
  - Female: 14 cases (30%)
- **Side Affected:**
  - Right-sided pain: 80%
  - Left-sided pain: 20%
- **The prevalence of tears increases with age.**

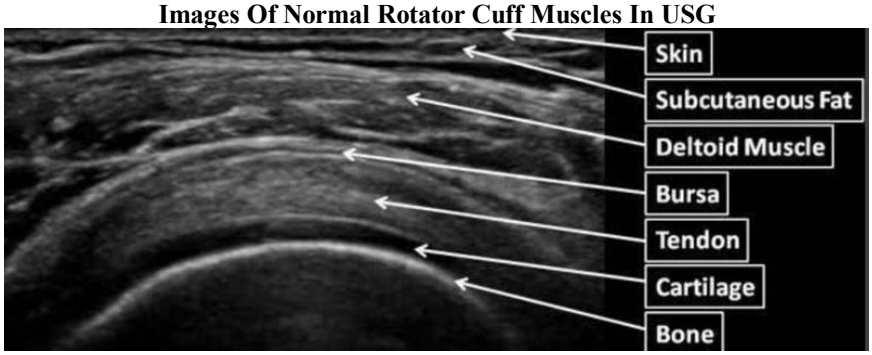


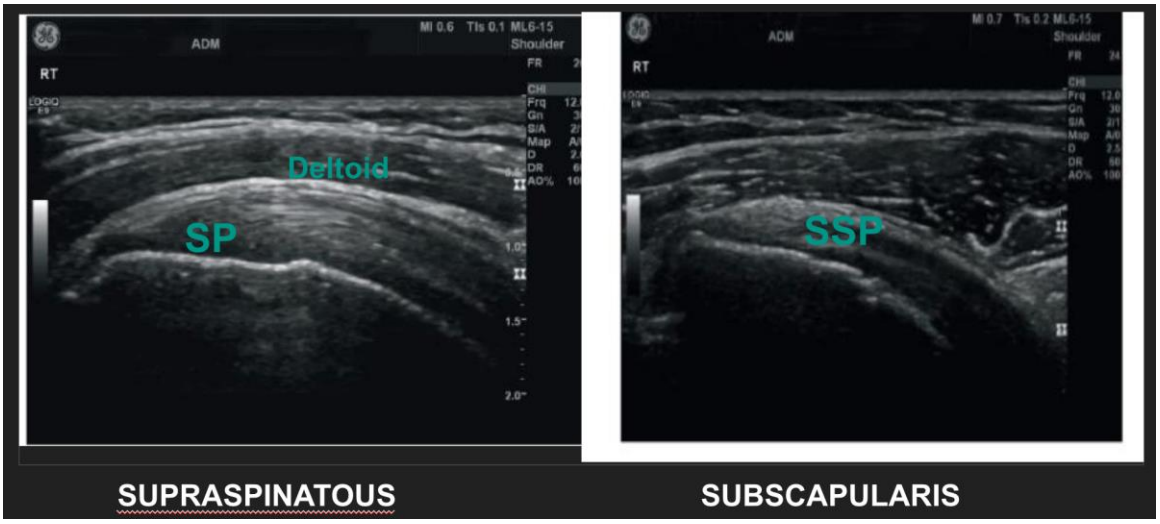
Rotator Cuff Pathologies:

Category	Number of Cases (n = 50) Rotator cuff tear (n=25)	Percentage (%)
Partial Thickness Rotator Cuff Tear	11 (out of 25 cases)	40% (of 50%)
Full Thickness Rotator Cuff Tear	16 (out of 25 cases)	60% (of 50%)
Rotator Cuff Tendinitis	7	20%
Degenerative Causes	6	10%
No Pathology Found	10	20%



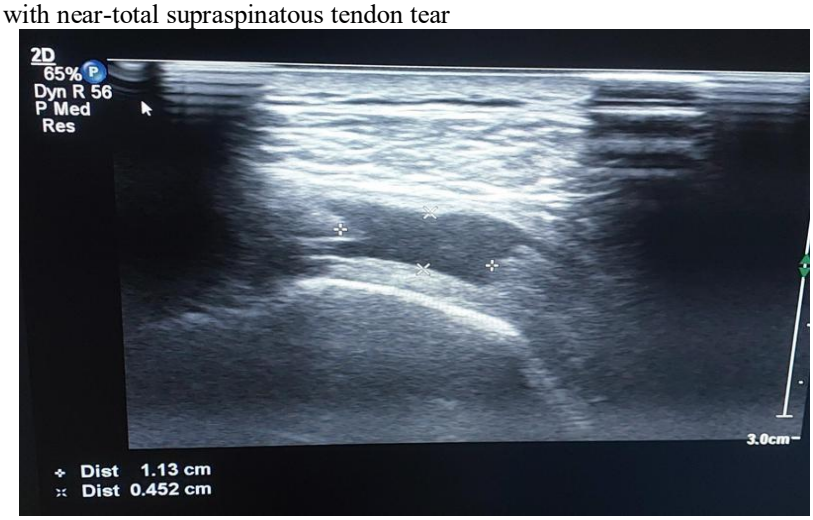
Images Of Normal Rotator Cuff Muscles In USG



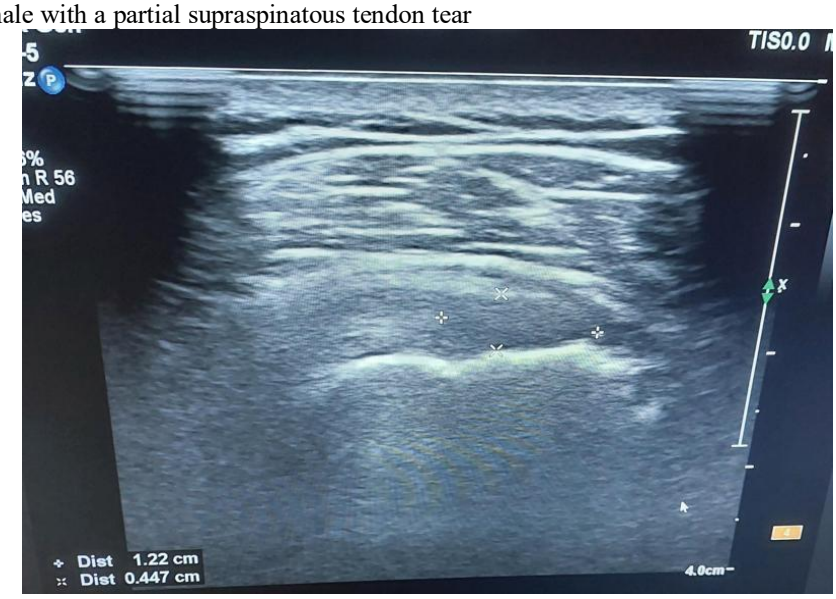


Reference Images Showing The Pathologies

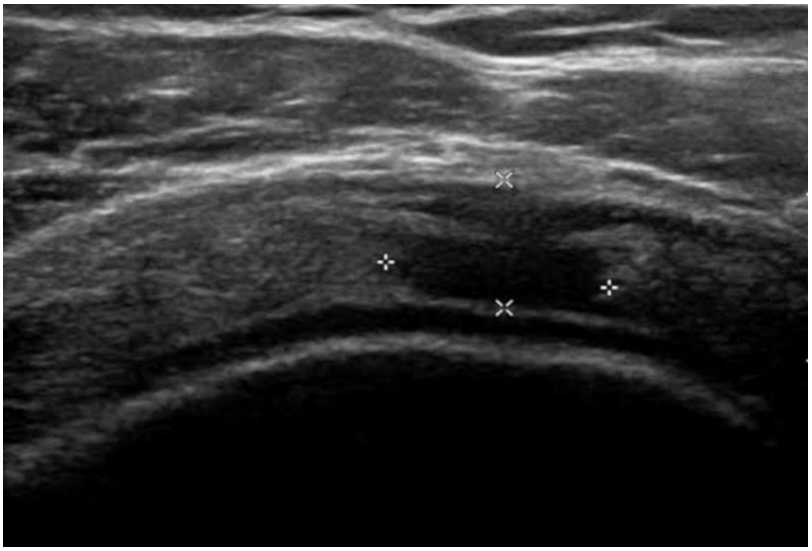
- 59-year-old male with near-total supraspinatous tendon tear



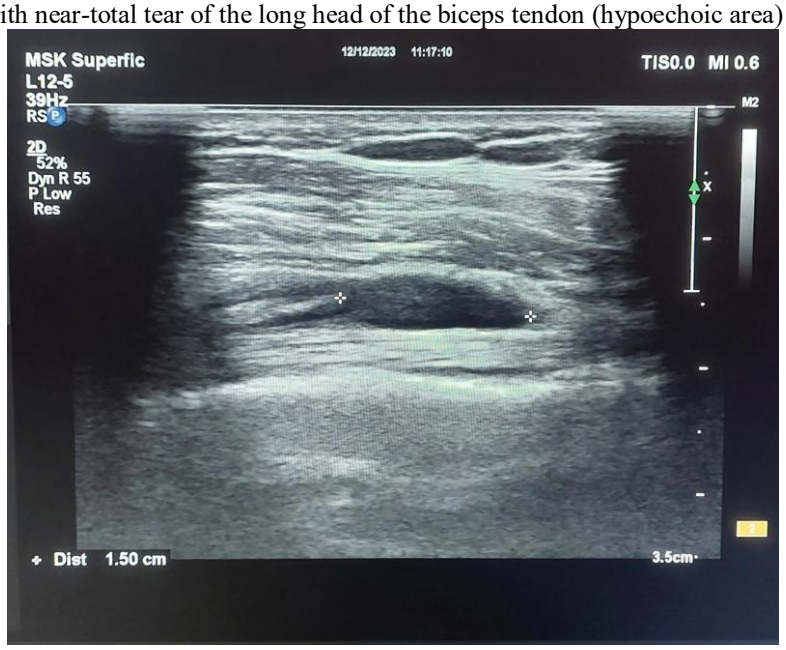
- A 50-year-old male with a partial supraspinatous tendon tear

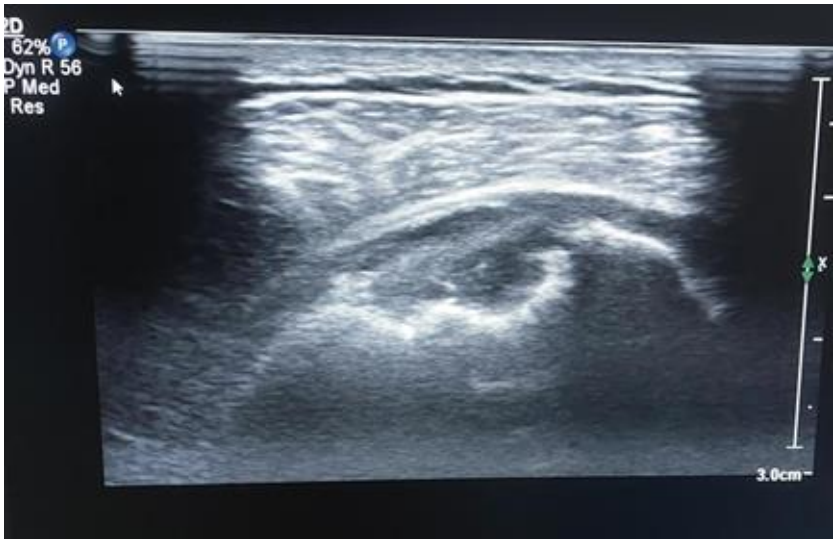


- A 45-year-old male with Supraspinatous tendon tear



- 32-year-old male with near-total tear of the long head of the biceps tendon (hypoechoic area)





- Clacific foci in biceps

DISCUSSION

High-resolution US is a non-invasive, low-cost technique that enables excellent visualization of all rotator cuff tendons, including articular surfaces, bursal surfaces, and intratendinous pathologies.

The **diagnostic accuracy** of ultrasonography is favorable for identifying and measuring the extent of both **partial- and full-thickness rotator cuff tears**.

Ultrasonography provides a **reliable, fast, inexpensive, and patient-friendly** diagnostic option for rotator cuff evaluation. Adequate anatomical knowledge and **standardized scanning techniques** are essential to avoid misdiagnosis due to artifacts or anatomical complexity.

CONCLUSION

The study findings demonstrate that **ultrasound can detect various shoulder pathologies**, with the **most common findings** including:

- **Tendonitis** in **Subscapularis** and **Biceps**
- **Full-thickness tears** in **Supraspinatus**
- Followed by **Biceps injury**, **degenerative changes**, and **calcific foci** in associated visualized musculoskeletal structures.

Ultrasound is more accurate in diagnosing full-thickness tears compared to partial-thickness muscle tears.

MRI should be employed to evaluate patients with persistent symptoms and inconclusive or negative findings on ultrasound.

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