

MRI Versus Arthroscopy in the Diagnosis of Rotator Cuff Tears**Dimmiti Srikanth Roy¹, Sagar Haritha Singh², P. Surendranath Reddy³, Rohit Ranjolkar⁴**¹Assistant Professor, Department of Orthopaedic, MNR Medical College and Hospital, Sangareddy, Telangana, India²Assistant Professor, Department of Orthopaedic, MNR Medical College and Hospital, Sangareddy, Telangana, India³Professor, Department of Orthopaedic, MNR Medical College and Hospital, Sangareddy, Telangana, India⁴Associate Professor, Department of Orthopaedic, MNR Medical College and Hospital, Sangareddy, Telangana, India

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Abstract**Background:** Rotator cuff tears play a crucial role in the movement and stabilization of the shoulder joint. It may be traumatic or degenerative, chronic or acute, and partial or complete. A tear of the rotator cuff muscle, small, medium, large, or massive, has to be evaluated accurately to stabilize the shoulder joint and proper movements.**Method:** 50 (fifty) adult patients underwent arthroscopy and MRI procedures; moreover, a clinical examination was also carried out to study the range or degree of movements that take place at the shoulder joint to predict the severity of the tear of the rotator cuff.**Results:** Out of 50 (fifty) 31 (62%) right shoulders, 19 (38%) left shoulder are affected; the PPV of the supraspinatus is 937, followed by 60 subscapulae and 307 infraspinatus in the arthroscopic study. MRI study has a higher PPV than arthroscopy.**Conclusion:** In addition to clinical examination, noninvasive MRI plays a vital role in diagnosing the severity of rotator cuff tears, which helps determine whether conservative treatment or surgical interventions are needed, although arthroscopy remains the gold standard method.**Keywords:** Arthroscopy, MRI, Rotator cuff, Lift of Test, Empty Can Test.**DOI:** 10.25258/ijcpr.18.10.71

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Introduction

The rotator cuff, composed of the supraspinatus, infraspinatus, subscapularis, and teres minor tendons, plays a crucial role in the movements and stabilization of the shoulder joint [1].

The rotator cuff tear coupled with complications is one of the most common factors causing motor disability as well as serous shoulder pain, accounting for 70% of all patients with shoulder dysfunction.

Tearing of rotator cuff muscles is observed in the aging population as compared to young people. Rotator cuff tears can be classified as traumatic or degenerative, acute or chronic, and the size of the lesion is partial or full thickness, small, medium, large, or massive lesions are used to describe the size of tears [2]. All these factors affect or decide the treatment decisions. Early diagnosis of rotator

cuff tear and its extent is essential, which helps to determine appropriate treatment methods and conservative versus surgical strategy [3].

Usually, arthroscopy technique extends the capabilities of conventional MRI in the detection of rotator cuff tears and their pathology [4]. Hence, an attempt is made to compare the arthroscopy and MRI study to evaluate the severity of rotator cuff tears with their pathologies.

Material and Method

50 (fifty) adult patients aged between 25 and 55 years who visited the orthopedic department of MNR Medical College Hospital, Sangareddy-502294, Telangana, were studied.

Inclusive Criteria: The patients with traumatic or degenerative shoulder pain positive for clinical

examination for rotator cuff lesions since the duration of six months or longer, who required surgical management. The patients who gave their consent in writing for study were selected.

Exclusion Criteria: The patients are below 20 years of age or have had a fracture of the shoulder joint or shoulder dislocation earlier. The patients in whom MRI is contraindicated and claustrophobic patients were excluded.

Method: Every patient was clinically evaluated by a surgeon and filled out the proforma. Patients underwent MRI, and findings are evaluated.

Clinical Examination: The protocol included inspection for atrophy of rotator cuff muscles, viz., deltoid, supraspinatus, infraspinatus, and subscapularis muscles, and palpation for eliciting tenderness of the sternoclavicular, acromioclavicular, subacromial, and biceps regions.

Range of movements of the shoulder was assessed, including abduction, internal rotation, and external rotation, by visual examination. The specific tests performed included the life of test (Gerber's), the empty can test, the Hawkins-Kennedy test, and the horn bowler's sign.

Imaging: MRI (1.5T) was performed according to standard radiological protocols. This comprised a coronal oblique fat-saturated T2 and proton density-weighted series aligned along the line of the supraspinatus tendon to visualize the supraspinatus and infraspinatus tendons together with an axillary-acquired T1 and fat-saturated T2-weighted sequence to visualize subscapularis and teres minor. The thickness of the slice was 3 mm.

The MRI evaluations of rotator cuff disease are as follows:

- **Full-thickness tear:** A continuous band of fluid transversing the full thickness of the cuff on the fluid-sensitive sequences, retraction of the tendon, and high signal intensity in the cuff on both T2-weighted and proton-density images.
- **Partial thickness tear:** A continuous band of fluid that does not transverse the full thickness of the cuff on the fluid-sensitive sequences and has high signal intensity in the cuff on T2 and proton density images.
- **Arthroscopy:** Every patient standard diagnostic arthroscopy before proceeding to a therapeutic procedure. Initially, the gleno-humeral joint was assessed using standard viewing and instrumentation portals.

The articular surfaces of the subscapularis, supraspinatus, and infraspinatus were then examined.

Fraying with exposure of more than 2 mm of the cuff bony footprint was considered to represent an articular-sided partial thickness tear.

A full-thickness tear occurred where a tear in a tendon insertion communicated through to the subacromial space. Avulsion of an entire tendon insertion was considered a complete tendon rupture. The subacromial space was also assessed to look for bursal-sided partial tears, and confirmation of a full-thickness tear or a complete tendon rupture was viewed and recorded.

The clinical and MRI diagnoses were compared with arthroscopy findings. In the present study arthroscopy findings are considered the gold standard for diagnosing pathological changes in the rotator cuff tendons.

The findings are confirmed true positive if the clinical diagnosis or MRI diagnosis confirms the arthroscopic findings are false positives if the clinical examination or MRI diagnosis of rotator cuff injury is found to be normal during arthroscopy. A finding is considered a false negative if cuff pathology is missed during clinical examination.

The duration of the study was February 2025 to March 2026.

Statistical Analysis: The sensitivity and specificity of clinical examination and MRI findings were assessed against arthroscopy and calculated with a 95% confidence interval. The statistical analysis was carried out in SPSS software; the ratio of male and female was 2:1.

Observation and Results

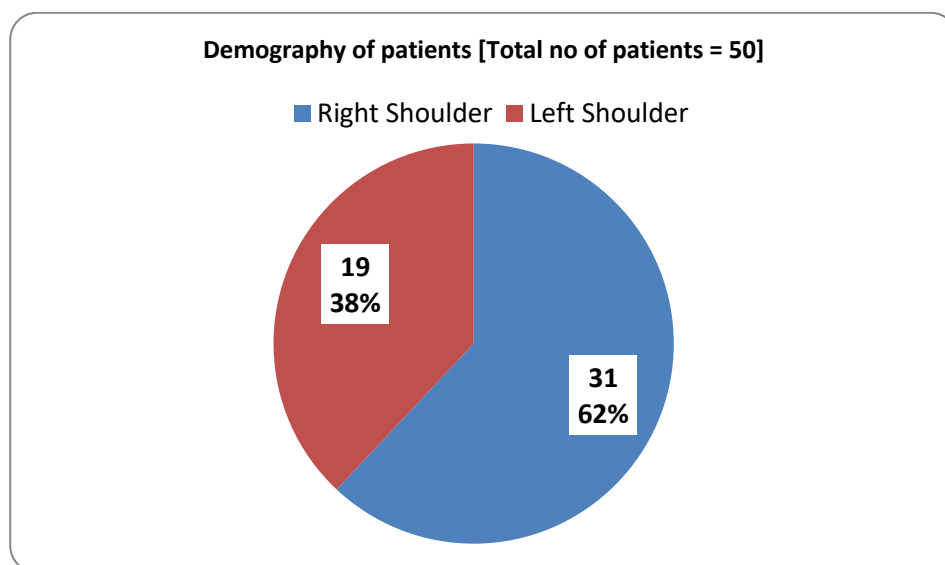
Table 1: 31 (62%) right shoulder, 19 (38%) left shoulder.

Table 2: Clinical test for supraspinatus high sensitivity (90) but low specificity (75). The clinical test is very not specific or sensitive for infraspinatus pathologies. The clinical test showed the least specificity for subscapularis pathologies (52.65).

Table 3: MRI showed higher specificity and sensitivity for supraspinatus (90, 85), but infraspinatus had lower sensitivity and specificity (75). MRI evaluation greatly increased as compared to arthroscopy.

Table 1: Demography of patients (Total no of patients = 50)

Details	No. of Patient	Percentage %
Right Shoulder	31	62%
Left Shoulder	19	38%

**Figure 1: Demography of patients [Total no of patients = 50]****Table 2: Study of clinical trials versus arthroscopy (Total no of patients = 50)**

Details	Supraspinatus	Infraspinatus	Subscapularis
Sensitivity	90	75	80
Specificity	75	75	52.65
PPV	93.78	60	30.79
NPV	37.8	85.72	90.02

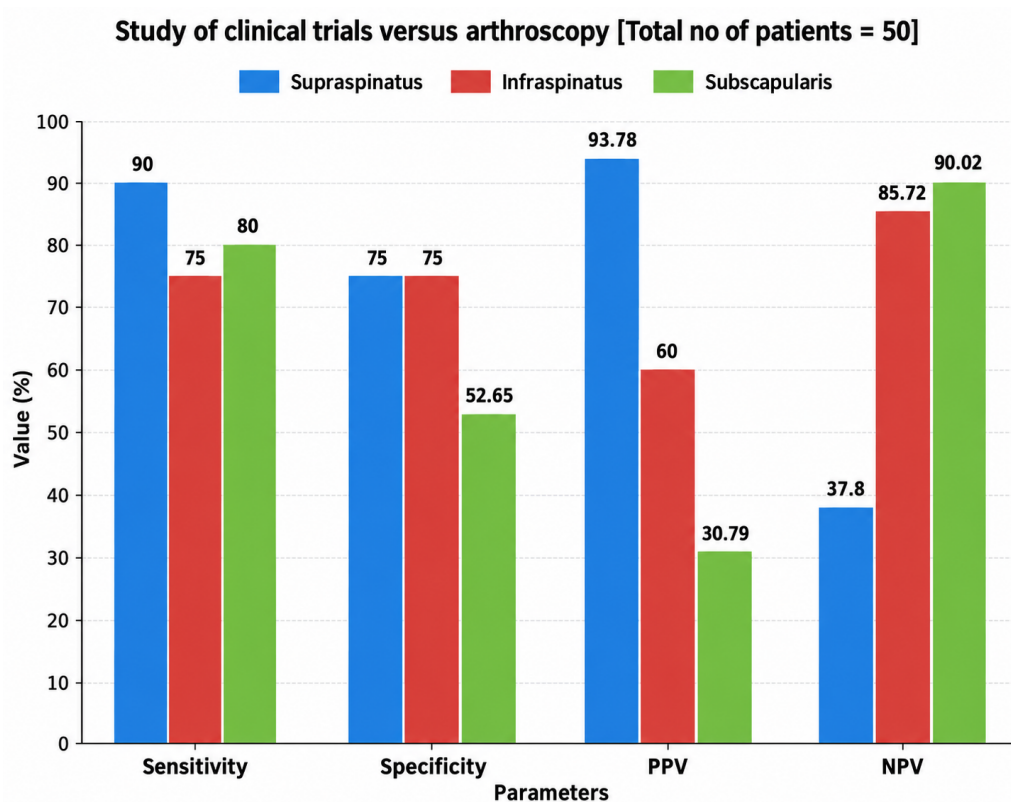
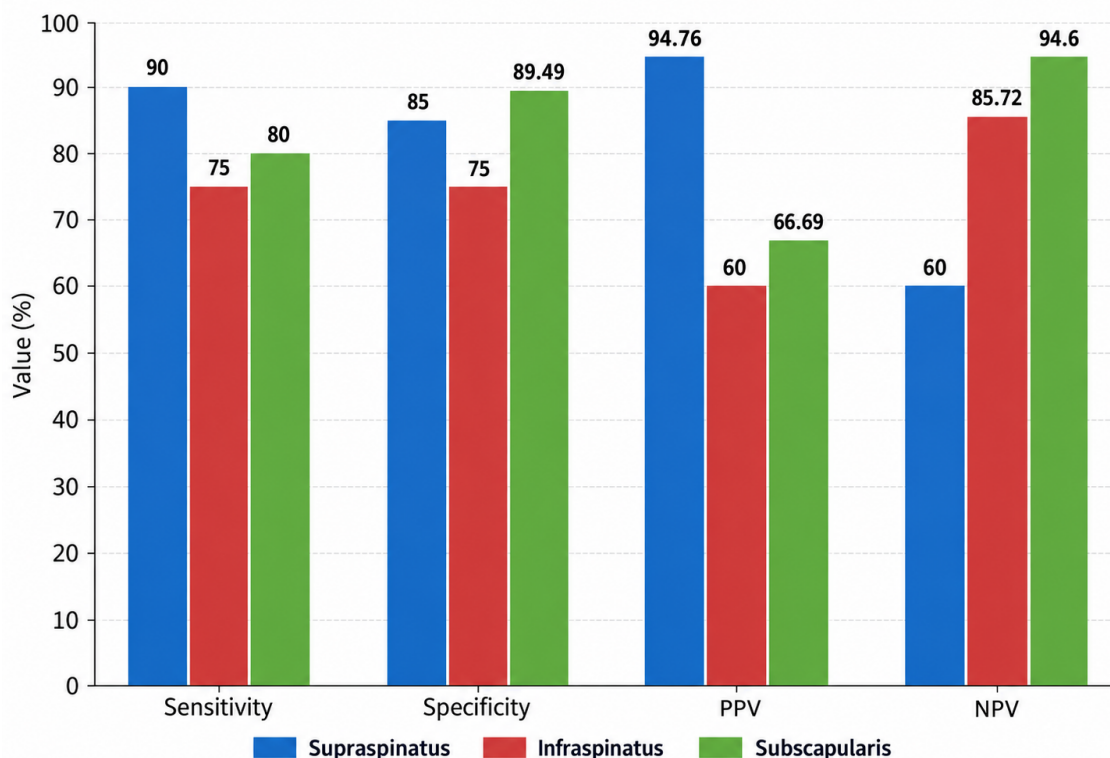
**Figure 2: Study of clinical trials versus arthroscopy [Total no of patients = 50]**

Table 3: Study of MRI versus arthroscopy

Details	Supraspinatus	Infraspinatus	Subscapularis
Sensitivity	90	75	80
Specificity	85	75	89.49
PPV	94.76	60	66.69
NPV	60	85.72	94.6

Study of MRI versus arthroscopy

**Figure 3: Study of MRI versus arthroscopy**

Discussion

Present study of MRI versus arthroscopy in the diagnosis of rotator cuff tears in the Telangana population. Out of 50, 31 (62%) had right shoulder, and 19 (62%) had left shoulder rotator cuff tears diagnosed (Table-1). In the study of clinical trials versus arthroscopy, 90 sensitivity and 93.78 PPV were observed in the supraspinatus, and the least PPV, 30.79, was observed in the subscapularis muscle (Table-2). In the study of MRI versus arthroscopy, 94.76 PPV was observed in the supraspinatus, followed by 66.69 in the subscapularis and 60 in the infraspinatus muscle, and the highest sensitivity, 90, was in the supraspinatus muscle (Table-3). These findings are more or less in agreement with previous studies [5,6,7]. The diagnostic efficiency of MRI had high sensitivity and specificity. However, the lower NPV of 60% suggests that a negative MRI may not be reliable to rule out labial tear; thus, arthroscopic evaluation is still required to confirm the labial tear. The SLAP injury is a tear of the superior labrum in 8% in MRI and 12% in arthroscopy [8].

It suggests that SLAP injuries are underdiagnosed in MR imaging.

Secondary to their subtle appearance and difficulty in identifying SLAP injuries on MRI study. SLAP injuries involve detachment at the biceps tendon attachment site, and their cuff injuries are the majority of supraspinatus tendon injuries where tear thickness is 80% [9]. Several conditions could account for differences between MRI and arthroscopy results, including normal intralabial signal changes, variations in the labial morphology, and the absence of joint effusion, making it difficult to detect minute tears [10]. It is also reported that experienced radiologists or surgeons treat anatomical abnormalities such as sublabral recess, sublabral foramen, and Buford complex as tears of labrum, especially in the antero-superior quadrant; hence, the diagnostic evaluation of tears of the antero-superior portion of the glenoid labrum remains challenging and requires thorough knowledge and understanding of anatomy because SLAP injuries may be confused with normal

anatomical variations of the labrum and vice versa [11].

Summary and Conclusion

In the present study of MRI versus arthroscopic approach to diagnose the rotator cuff tears. MRI is recommended to be a first-choice imaging modality, but arthroscopy remains gold standard and MRI cannot replace arthroscopy because arthroscopy reveals the accuracy and practicality. Above all anatomical knowledge of the shoulder joint that a radiologist and surgeon will justify the diagnosis of rotator cuff tears.

Limitation of study: Owing to the remote location of the research center, small number of patients, and lack of the latest techniques, we have limited findings and results.

This research paper was approved by the Ethical Committee of MNR Medical College and Hospital, Sangareddy-502294, Telangana, India.

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