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MRI EVALUATION OF SHOULDER JOINT PATHOLOGIES

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ABSTRACT

Background: Shoulder pain is one of the most common complaint in the medical practice and often leads to significant disabilities. The prevalence of shoulder pain has been reported to range from 7% to 14% of the overall population.

Objective: To evaluate the role of Magnetic Resonance Imaging in clinically suspected cases of rotator cuff injury and glenohumeral instability.

Methods: The present study was carried out on 30 patients presenting with shoulder pain clinically suspected with either rotator cuff pathology or glenohumeral instability.

Results: Trauma was the etiology in 63% of the cases. Most common acromion type was type I acromion process (63%). Most common type of acromion causing subacromial impingement was type III acromion process. Acromioclavicular joint hypertrophy was noted in 10% of cases. Out of 30 cases studied, Rotator cuff pathologies were found in 60% (18) of patients. MRI was 85% sensitive, 94% specific and 90% accurate in diagnosing all (partial and full thickness) rotator cuff tears. Glenohumeral instability lesions were found in 57% (17) of patients. Bankart lesion was the most common lesion associated with glenohumeral instability, accounting to 50% of cases. Hill-Sachs lesion was seen in 40% and SLAP lesion in 6% of cases. MRI has higher sensitivity for detection of bony Bankart lesion than labral bankart lesion. The sensitivity, specificity and accuracy of MRI for the diagnosis of Hill-Sachs lesion were 100%, 89% and 93% respectively. All the patients with Hill-Sachs lesion had either an associated Bankart lesion or its variant.

Conclusions: MRI can be considered almost equally effective as compared to arthroscopy in the evaluation of shoulder pathologies.

Keywords: Magnetic Resonance Imaging, rotator cuff injury, glenohumeral instability

Introduction

The initial evaluation of shoulder disorders usually consists of taking the clinical history and performing a physical examination, which includes various manipulative tests. But majority of the patients come with pain & restrictive movements of the joint, so in these patients a thorough

physical examination is difficult.(1)

The role of magnetic resonance imaging [MRI] in the diagnosis of shoulder disorders has been established. The strength of MRI lies in its ability to assess sonographically inaccessible areas such as labrum, deep parts of various ligaments, capsule and areas obscured by bone.(2) Technical improvements along with better understanding of the anatomy of the shoulder have made MRI the most sensitive imaging modality for evaluation of painful shoulder.(3) Currently it is being used as the primary form of investigation for recurrent dislocations, labral lesions, articular cartilage, synovial disease, tumors and infection. It also accurately depicts associated muscle abnormalities and thus helps in recognizing surgically amenable pathologies. In addition it can reveal other causes of painful shoulder that clinically mimic rotator cuff disease.

MR arthrography, introduced in 1990 clearly outlines intrarticular structures such as labrum and capsular ligaments and also demonstrates communication between the joint and extra articular abnormalities like paralabral cysts and bursae. As it improves visualization of a variety of capsular-labral lesions, in comparison to conventional MRI, it provides, critical information concerning the surgical or arthroscopic repair. It is used in post-operative assessment and also for investigating patients experiencing instability, especially in setting of labral injury. The main disadvantage of procedure is needle placement within the joint leading to infection, hemorrhage and synovial reaction to contrast medium.(4)

Arthroscopy is currently regarded as the reference standard for the diagnosis of intra articular shoulder disorders.(5) It allows the surgeon to identify all the structures of the glenohumeral joint such as the labrum, glenohumeral ligaments, humeral head, joint capsule and undersurface of the rotator cuff.(6) MR imaging is noninvasive, has proved reliable and safe and offers advantages over diagnostic arthroscopy, which is an invasive procedure with certain risks and discomfort for the patient and is preferably performed only for treatment purposes.(5)

Materials and Methods: This Prospective Study was conducted at Kamineni institute of Medical sciences, Narketpally during a study Period October 2013 - September 2015. The study was approved by the Institutional Ethics Committee, Kamineni institute of medical sciences, Narketpally, Sample size were 30.

INCLUSION CRITERIA:

Patients from all age groups including both men and women were taken up for study. The following criteria were used to select the patients.

- Patient presenting with a history of trauma or recurrent shoulder dislocation
- Patients who were clinically diagnosed to have general shoulder pathology based on a positive Mazion manouver, dislocation based on a positive Dugas or Hamilton ruler test, and or rotation cuff pathology based on a positive external or internal lag test
- Plain film radiography suggestive of rotator cuff degeneration such as cystic and sclerotic changes at greater tuberosity or undersurface of acromion and calcific tendinits

EXCLUSION CRITERIA:

Diagnosed cases of any tumor, arthritis, osteonecrosis, periarthritis of shoulder or those who had already undergone shoulder surgery were excluded from the study. Those with general contraindications to MRI evaluation i.e. patients with pacemaker, metallic implants or claustrophobic patients were also excluded.

A proforma was designed based on the objectives of the study. Detailed clinical history was taken and relevant clinical examination was performed. All patients were subjected to shoulder radiography - AP and Axial views followed by MR Imaging and subsequently with therapeutic or diagnostic arthroscopy or open surgery of the symptomatic shoulder. Informed consent was taken from the patient before the examination.

MRI was performed on Siemens Magnetom Essenza 1.5 Tesla machine. Scanning technique:

Transmit-receive extremity coil was applied as close as possible to the symptomatic shoulder joint.

The patient was placed in supine position with the shoulder and arm placed along the side and parallel to the body, positioned in neutral to mild external rotation. A 4-channel flex coil was used for examination.

ARTHROSCOPY:

Patients were examined by the orthopedic surgeon and were referred to the radiology department with physical examination details. All patients underwent arthroscopic surgery with or without repair.

Arthroscopy was performed, under general anesthesia, using a posterior portal for the arthroscope. In addition, an anterior portal was used for introduction of cannula and surgical instruments: accessory portals, including lateral portal was used for subacromial decompression and a superior portal was also used when necessary. During arthroscopy, the entire joint, including the inferior recess, the glenohumeral joint, the glenoid labrum, the rotator cuff, the glenohumeral ligaments, the long head of biceps insertion was carefully and systematically examined. The arthroscopic images were recorded on a digitized computer.

IMAGE ANALYSIS:

All MR studies were prospectively interpreted using established criteria for diagnosing shoulder disorders. Rotator cuff tears were diagnosed on MR imaging on the basis of the presence of increased signal intensity in the distal tendon. In case of focus of bright signal intensity either in the bursal or articular surface of the tendon that did not involve the entire thickness, the tear was termed partial. If tendon margins were not identified or there is tendon retraction and joint fluid or if there is granulation tissue at the tear site, the tear was termed complete.(7)

The rotator cuff tendinosis was diagnosed if there is one of the following three criteria: increased signal intensity less than that of fluid within the supraspinatus tendon on T2-weighted images that does not meet the criteria for a partial tear; extensive or heterogeneous increased signal intensity within the supraspinatus tendon on T1-weighted images; or abnormal morphology of the distal supraspinatus tendon.(8)

On arthroscopy, a complete tear of the rotator cuff tendon was diagnosed if the tendon was absent in the insertion region, or if there was loss of tendon continuity with only tendon remnants at each end. In cases where continuity of few fibers for the tendon was present and laxity of the tendon was noted by probing, this was defined as a partial tear. The diagnosis of impingement is confirmed by inflammation of bursal tissue, fraying of the rotator cuff and erosion at the undersurface of the leading edge of acromion. The labral type Bankart lesion was diagnosed if both the labrum and periosteum are torn and separated from the glenoid. In the bony Bankart lesion there is a flake avulsion, pulled off the anteroinferior scapular neck. SLAP lesions were diagnosed if there is fraying and degeneration of the edge of the superior labrum with or without detachment from labrum and the biceps anchor.(9)

For each shoulder, we correlated the radiologic and operative findings for following structures [all four rotator cuff tendons and biceps tendon, glenoid labrum, subacromial space]. Findings of clinical, MRI, and arthroscopic examination were noted and compared. Arthroscopic findings were regarded as the gold standard.

STASTISTICAL ANALYSIS:

A result was considered true positive if MRI diagnosis of a finding was confirmed at arthroscopy. A result was considered true negative if a diagnosis of no finding on MRI was confirmed at arthroscopy. A result was considered false positive when a finding interpreted on MRI was not found on arthroscopy. If arthroscopy was positive for a finding but the MRI images were negative, this was considered false negative result. Based on 4 categories, 5 parameters were calculated to assess the reliability of MRI results, namely; sensitivity, specificity, positive predictive value, negative predictive value and accuracy. All statistical analysis were done by means of SPSS software, version 15.

Results:

A Total of 30 patients with shoulder pain due to various intraarticular shoulder pathologies were evaluated.The most common age group affected was 31-40 years (30%)

Of the 30 patients studied, 18 (60%) patients were males and 12 (40%) were females.

Out of 30 patients, 20 (67%) patients had shoulder pain on right side and 10 (33%) patients on left side.

History of injury to the affected shoulder was found in 19 (63%) patients. 11 (37%) patients had no known cause of injury with gradual onset of symptoms.Trauma was the most common cause of shoulder pain

Among 30 patients, type I acromion was found in 19 (63%) patients, type II in 9 (30%) patients and type III in 2 (7%) patients. None of them had type 4 acromion. The most common type of Acromion was type I

TABLE 1: DISTRIBUTION OF PATIENTS ACCORDING TO ACROMION TYPE (n=30)

Type	Number of patients	Percentage
Type I	19	63
Type II	9	30
Type III	2	7
Type IV	0	0
Total	30	100

Degenerative changes of acromio-clavicular joint were found in 3 (10%) cases.

TABLE 2: CASES SHOWING ACROMIO-CLAVICULAR JOINT DEGENERATION (n=30)

AC Joint degeneration	Number of patients	Percentage
Present	3	10
Absent	27	90
Total	30	100

Effusion in the joint space, biceps tendon sheath and subacromial bursa were highly indicative of rotator cuff tear. 6 (20%) cases showed Joint effusion, 10 (33%) cases showed Bursal collection [Subacromial and Subcoracoid bursa] and 9 (30%) cases showed effusion around biceps tendon sheath.

On the basis of history and clinical examination, patients were categorized into 2 groups. Those with either of the following lesions:

1. ROTATOR CUFF PATHOLOGIES:

Rotator cuff tears, tendinosis and impingement (subacromial/subcoracoid) were considered as rotator cuff pathologies.

2. GLENOHUMERAL INSTABILITY LESIONS:

Anterior instability was associated with injuries of the anterior labrum and the anterior band of the inferior glenohumeral ligament, in the form of Bankart lesion and its variants; whereas posterior instability was associated with reverse Bankart and reverse Hill-Sachs lesion. SLAP lesions, superior and middle glenohumeral ligament avulsion were considered as microinstability lesions.

Out of 30 cases studied, Rotator cuff pathologies were found in 13 (43%) patients and Glenohumeral instability lesions in 12 (40%) patients. Both the pathologies were found in 5 (17%) patients. So, a total of 18 (60%) patients had rotator cuff pathologies and 17 (57%) patients had

glenohumeral instability lesions.

TABLE 3: CASE-WISE DISTRIBUTION OF PATIENTS (n=30)

Pathology	Number of patients	Percentage
Rotator cuff pathologies	13	43
Glenohumeral instability lesions	12	40
Both	5	17
Total	30	100

Rotator cuff pathology was the most common pathology affecting shoulder joint

ROTATOR CUFF PATHOLOGIES:

A total of 18 (60%) patients had rotator cuff pathologies on arthroscopy. Out of them, 14 (77%) patients had rotator cuff tears and 4 (23%) patients had tendinosis. Five of these cases also showed findings of subacromial impingement.

TABLE 4: VARIOUS FINDINGS OF ROTATOR CUFF PATHOLOGIES ON MRI AND ARTHROSCOPY (n=18)

Pathology	**No. of patients (%)**	
	MRI	**Arthroscopy**
Rotator cuff tear	12 (67%)	14 (77%)
Rotator cuff tendinosis	3 (16%)	4 (23%)

Rotator cuff tear was the most common lesion among rotator cuff pathologies

ROTATOR CUFF TEARS:

Fourteen patients were found to have rotator cuff tears on arthroscopy. Twelve of them were correctly diagnosed on MRI. Two patients with partial thickness tear were missed on MRI. Sixteen patients were found to have no rotator cuff tears on arthroscopy. Fifteen of them were correctly diagnosed on MRI. One patient interpreted as rotator cuff tear on MRI was found to be normal on arthroscopy.

TABLE 5: VALIDITY OF MRI IN DETECTING ROTATOR CUFF TEARS (n=30)

TEST		**ARTHROSCOPY**		**TOTAL**
		Positive	Negative	
MRI	Positive	12	1	13
	Negative	2	15	17
TOTAL		14	16	30

A total of twenty-three rotator cuff tendon tears were found on arthroscopy. Out of them eight (35%) tendons were found to have full thickness tear and fifteen (65%) of them were found to have partial thickness tear.

TABLE 6: DISTRIBUTION ACCORDING TO TYPE OF TEAR (n=23)

Type of tear	Subscapularis	Supraspinatus	Infraspinatus	Teres minor	Total
Full thickness	1	5	2	0	8(35%)
Partial thickness	3	7	4	1	15(65%)
Total	4(18%)	12(52%)	6(26%)	1(4%)	23(100%)

Supraspinatus was the most commonly affected tendon (52%)

A) ***FULL THICKNESS TEARS:***

A total of eight full-thickness tears were found on arthroscopy. Seven of them were correctly diagnosed on MRI. One tendon with full thickness tear was misdiagnosed as having complete thickness partial tear on MRI. The sensitivity, specificity, PPV, NPV and accuracy of MRI for the diagnosis of full thickness tears of rotator cuff tendons were 88%, 100%, 100%, 94% and 96% respectively

B) ***PARTIAL THICKNESS TEARS:***

A total of fifteen partial-thickness tears were found on arthroscopy. Out of them, nine (60%) were articular surface tears and six (40%) were bursal surface tears. Thirteen of them were correctly diagnosed on MRI. Two patients with partial thickness tear of distal supraspinatus tendon were missed on MRI. One tendon was falsely interpreted as having partial thickness tear on MRI. The sensitivity, specificity, PPV, NPV and accuracy of MRI for the diagnosis of partial thickness tears of rotator cuff tendons were 87%, 88%, 93%, 78% and 87% respectively.

ROTATOR CUFF TENDINOSIS:

Four patients were found to have tendinosis on arthroscopy. Three of them were correctly interpreted on MRI. One patient with supraspinatus tendinosis was missed on MRI. Due to small number of cases diagnosed with rotator cuff tendinosis, statistical analysis was not performed.

SUBACROMIAL IMPINGEMENT:

Although impingement is a clinical diagnosis, five of the cases diagnosed with rotator cuff pathology were also found to have findings of subacromial impingement on arthroscopy. All of them were correctly identified on MRI. Of these, two patients had Type III acromion and three patients had acromioclavicular joint degenerative changes as the cause for impingement.

GLENOHUMERAL INSTABILITY LESIONS:

Patients either with tears of the labroligamentous complex (Bankart lesion or its variants) or fractures of osseous glenoid and humeral head (Bony Bankart lesion and Hill-Sachs lesion) were considered to have glenohumeral instability.

Of the 17 (57%) patients with Glenohumeral instability lesions, 15 patients had Bankart lesion and its variants, 12 patients had Hill-Sachs lesion and 2 patients had SLAP lesion. All the patients with Hill-Sachs lesion had either an associated Bankart lesion or its variant.

TABLE 7: VARIOUS FINDINGS OF GLENOHUMERAL INSTABILITY LESIONS ON MRI AND ARTHROSCOPY (n=17)

Lesion	No. of patients (%)	
	MRI	Arthroscopy
Bankart Lesion/variants	13 (43%)	15 (50%)
Hill-Sachs Lesion	12 (40%)	12 (40%)
SLAP Lesion	2 (6%)	2 (6%)

The most common lesion associated with Glenohumeral Instability was Bankart lesion

A) ***BANKART LESION AND ITS VARIANTS:***

A total of fifteen patients were found to have Bankart lesion or its variants on arthroscopy. Of them, twelve were labral type Bankart lesions, two bony Bankart lesions and one Perthes lesion. Thirteen of them were correctly diagnosed on MRI. Two patients with isolated Bankart lesion were missed on MRI. One patient was falsely interpreted to have Bankart lesion on MRI. Fourteen patients were found to have no Bankart lesion on both MRI and arthroscopy.

TABLE8: VALIDITY OF MRI IN DETECTING OVERALL BANKART LESION (n=30)

TEST		ARTHROSCOPY		TOTAL
		Positive	Negative	
MRI	Positive	13	1	14
	Negative	2	14	16
TOTAL		15	15	30

The sensitivity, specificity, PPV, NPV and accuracy of MRI for the diagnosis of Bankart lesion.

HILL-SACHS LESION:

A total of twelve patients were found to have Hill-Sachs lesion on arthroscopy. All were correctly diagnosed on MRI. Two patients were falsely diagnosed to have Hill- Sachs lesion on MRI. The sensitivity, specificity, PPV, NPV and accuracy of MRI for the diagnosis of Hill-Sachs lesion were 100%, 89%, 86%, 100% and 93% respectively.

B) ***SLAP LESION:***

Two patients were found to have SLAP lesions on arthroscopy. Both of them were correctly diagnosed on MRI.

A 45 year old female presented with right shoulder pain following trauma 3 months back

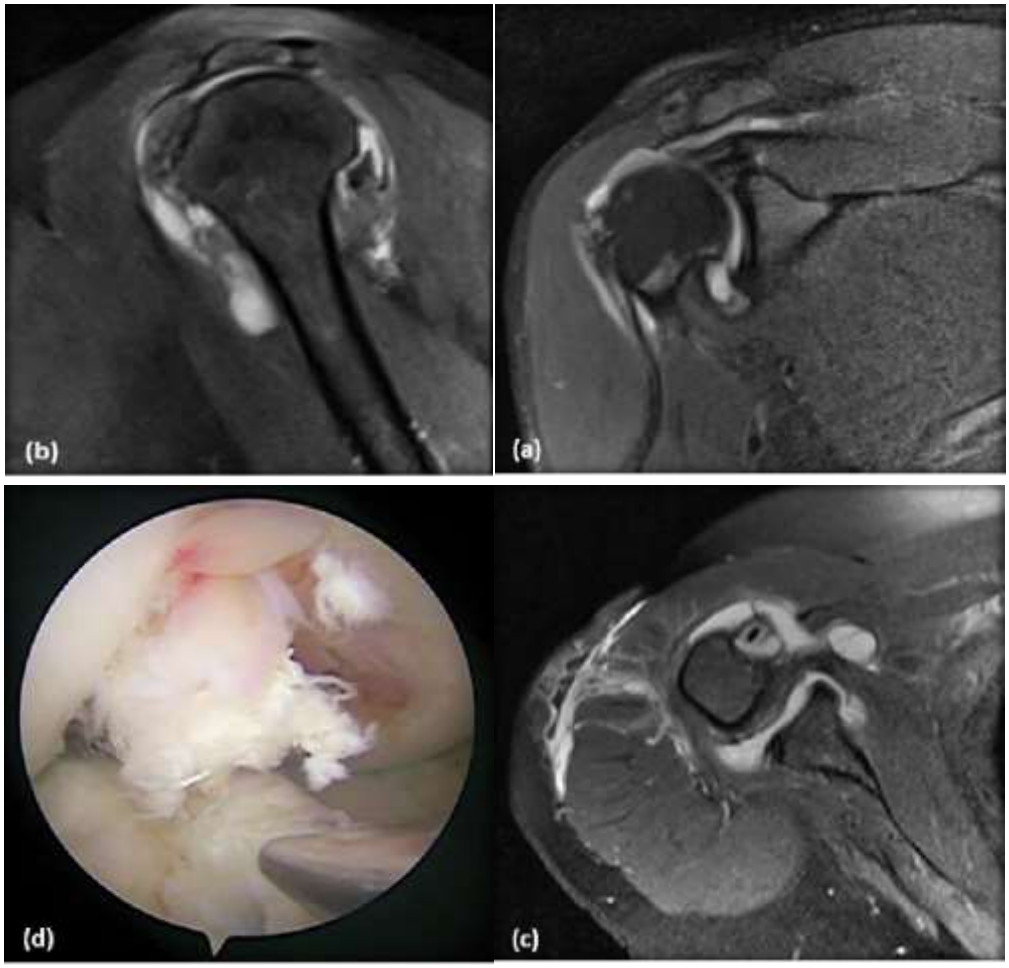

Figure 21:Coronal oblique PD FS image showing full thickness tear of supraspinatus tendon (a) Sagittal oblique PD FS image showing full thickness tear of supraspinatus tendon and partial tears of infraspinatus and subscapularis tendons
(b)Axial PD FS image showing joint effusion and bursal collections
(c) Arthroscopic image showing full thickness tear of supraspinatus tendon

A 21 year old male with history of recurrent dislocation of right shoulder underwent MRI

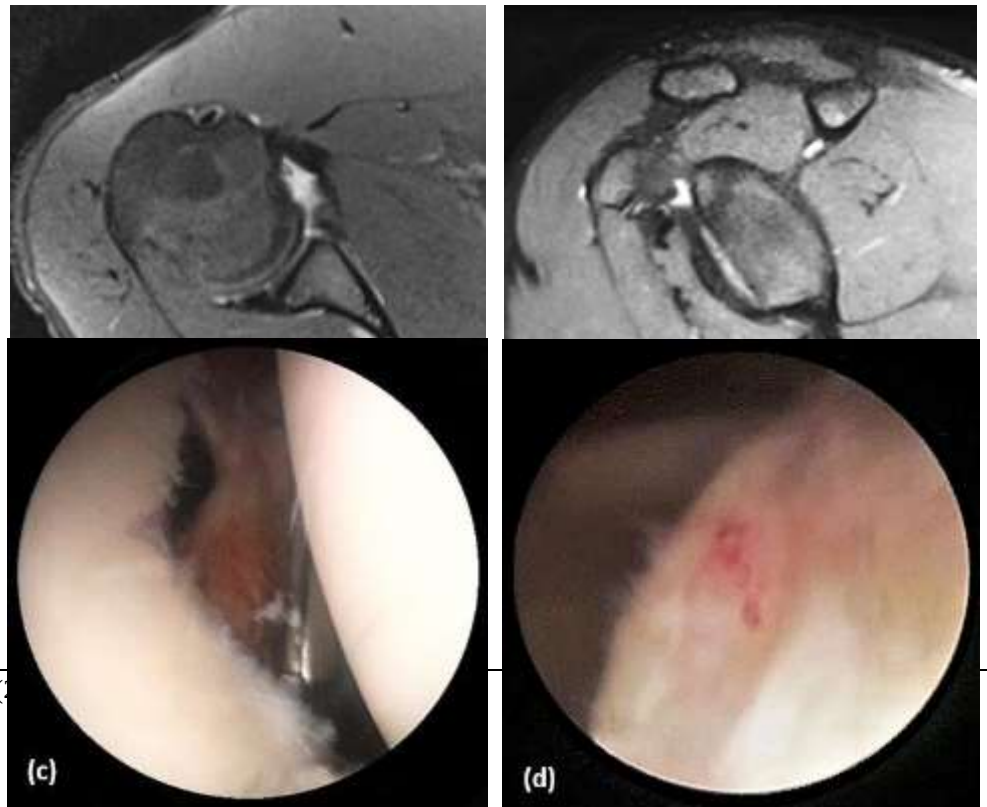

Figure 24:
(a) Axial PD FS image showing bony defect in the anteroinferior glenoid
(b) Sagittal oblique PD FS image showing bony Bankart lesion in the anterior labrum
(c) & (d) Corresponding arthroscopic images showing bony Bankart lesion and Hill- Sachs lesion

Discussion: Rotator cuff pathologies were found 60% (18) of patients and Glenohumeral instability lesions in 57% (17) of patients. Among the rotator cuff pathologies, rotator cuff tears were the most common lesions accounting to 77% of cases.

ROTATOR CUFF TEARS:

Of all the rotator cuff lesions detected on MRI, supraspinatus tendon was more commonly involved than infraspinatus or subscapularis tendon, constituting 52% of total tears. This is comparable to the study done by Zlatkin et al (10) wherein they found supraspinatus tendon involvement in around 80% of their cases. The characteristic anatomic location of the supraspinatus tendon is the likely cause. It is located between the greater tuberosity and the acromion process leading to repeated friction during overhead abduction of the shoulder.

A total of 23 rotator cuff tendon tears were identified. Out of them, 8 were full thickness and 15 were partial thickness tears. Of the 15 partial thickness tears, articular surface tears (60%) were more common than bursal surface tears (40%). Modi et al stated that Partial-thickness articular surface rotator cuff tears (PTASRCTs) are at least twice as common as bursal-sided tears and usually involve the supraspinatus tendon.(11)

The sensitivity (85%), specificity (94%) and accuracy (90%) for detecting rotator cuff tears in the present study are comparable to that of Zlatkin et al, who evaluated a series of 32 surgically confirmed cases and eight normal volunteers and found a sensitivity of 91%, specificity of 88% and accuracy of 89% for diagnosing all (complete and partial) rotator cuff tears.(10) Evancho and coworkers studied 31 symptomatic patients and found a sensitivity, specificity, and accuracy of 69%, 94%, and 84% for all rotator cuff tears.

FULL THICKNESS TEARS:

A total of eight full-thickness tears were found on arthroscopy. One patient with full thickness tear of supraspinatus tendon was misinterpreted as complete thickness partial tear on MRI. This patient presented with pain since 2 months following a history of trauma. On MRI, there was diffuse increase in signal intensity with preserved continuity on all sequences, which was reported as partial tear, which on subsequent arthroscopy was found to have full thickness tear. Farley et al (12) in his study found that mature fibrous scar tissue has the same imaging characteristics as a tendon. Therefore, chronic rotator cuff tears may appear as intact bands on MRI.

The sensitivity (88%), specificity (100%) and accuracy (96%) for diagnosis of full thickness tears in the present study are comparable to Evancho et al (13) who studied thirty one patients on 1.5 T MRI, followed by subsequent arthroscopy and found a sensitivity of 80%, specificity of 94% and accuracy of 89% for complete tears. A study done by Raffi and coworkers found a sensitivity of 97%, specificity of 94% and accuracy of 95% in the evaluation of full-thickness tears.(14)

PARTIAL THICKNESS TEARS:

A total of fifteen partial-thickness tears were found on arthroscopy. Two cases of partial thickness tears involving the supraspinatus tendon were missed on MRI. Isolated partial tears are difficult to detect on MRI because small area of increased signal intensity may be due to inflammation and edema from early stages of impingement, which was described by Evancho et al.(13)

The sensitivity (87%) and specificity (88%) and accuracy (87%) for diagnosis of partial rotator cuff tears in the present study are comparable to a study done by Raffi and coworkers (14) who assessed the diagnostic performance of MRI in 80 consecutive patients. For partial-thickness tears, the sensitivity was 89%, specificity was 84% and the accuracy was 85%.

ROTATOR CUFF TENDINOSIS:

One patient with supraspinatus tendinosis on arthroscopy was not interpreted as having tendinosis on MRI. In this case, there was inhomogenous incease in signal of the distal supraspinatus tendon on PD FS sequence which was overlooked as a partial volume averaging of superficial fibrofatty tissue. This partial volume averaging of the superficial fibrofatty or membranous tissues was also mentioned by Mirowitz (15) as a cause of this increased signal owing to the anterior curvature of the humeral head as well as the supraspinatus tendon.

SUBACROMIAL IMPINGEMENT

Five patients were found to have findings of subacromial impingement on both MRI and arthroscopy. Of these, two patients had Type III (Hooked) acromion causing impingement of the supraspinatus tendon. Also associated tendinosis of supraspinatus tendon was noted in one patient and partial thickness tear in the other patient. Bigliani (16) and his coworkers found that the hook-shaped acromion (Type III) may be the most common cause of anterior acromial impingement. It has the highest correlation with rotator cuff pathology, particularly rotator cuff tears. Correlation with surgical and arthrographic results revealed a 70% to 80% association of rotator cuff tears with Type III acromions.

A study by Peterson and coworkers (17) revealed an association of the AC joint osteophytes and supraspinatus tendon pathology. This study revealed that 51% of patients with supraspinatus ruptures had these osteophytes, as compared to 14% of patients with no tear.

GLENOHUMERAL INSTABILITY LESIONS:

Bankart lesion was the most common lesion associated with glenohumeral instability accounting to 50% of cases followed by Hill-Sachs lesion (40%).

BANKART LESION AND ITS VARIANTS:

Two patients were falsely diagnosed to have normal glenoid labrum on MRI. These patients have come with pain and instability of shoulder, which was gradual in onset since long duration. Re review of these patients revealed the fibrous scar tissue around the labral detachment appearing as an amorphous hypointense signal, which was misinterpreted as a normal lesion on MRI. Patrick Omoumi et al (18) also mentioned for some cases of false negative MR diagnoses of a labral Bankart lesion due to chronicity.

The sensitivity (87%), specificity (93%) and accuracy (90%) of overall Bankart lesion of present study corresponds to that of Iannotti et al.(80) They studied thirty-nine patients with shoulder pain using conventional MRI and correlating with arthroscopy and surgery, found MRI to have a sensitivity of 88%, specificity of 93% and accuracy of 85% for overall Bankart lesions.

Gusmer et al. prospectively assessed the accuracy of unenhanced magnetic resonance imaging in the detection and localization of labral injuries in 103 patients with labral tears and found MRI to be 100% sensitive and 95% specific. They concluded MRI as an accurate technique for the detection and localization of labral injuries.(19)

Two patients were found to have bony (osseous) Bankart lesion and both of them were correctly diagnosed on MRI. The high sensitivity for detection of bony (osseous) Bankart lesion is due to surrounding soft tissue and bone marrow edema or fracture.(20)

HILL-SACHS LESION:

In the present study, a total of 12 Hill-Sachs lesions were identified. All the patients with Hill-Sachs lesion had an associated Bankart lesion or its variants. This high presence of associated lesions is due to the fact the biomechanical forces that result in Hill-Sachs lesion also result in Bankart lesion.

Two patients were falsely diagnosed to have Hill-Sachs lesion on MRI. One of the patients had come with pain in right shoulder with difficulty in overhead activities, which was due to old injury. The flattening of greater tuberosity of humerus found on MRI was interpreted as a possible Hill-Sachs lesion. He also had associated full thickness tears of supraspinatus and infraspinatus. This

flattening may be due to reactive bone marrow changes associated with tears. Patrick Omoumi et al (18) also mentioned same for some cases of false positive MR diagnoses of Hill-Sachs lesions due to reactive bone marrow changes.
The sensitivity (100%) and specificity (89%) for detecting Hill-Sachs lesion in the present study corresponds to that of Hayes et al.(21) They studied eighty-seven patients with shoulder pain on a 1.5 T MRI, and found a sensitivity of 96% and specificity of 91% for Hill-Sachs lesions.

SLAP LESION:

Superior labral anterior posterior (SLAP) lesion was first described by Snyder (22). SLAP lesions are frequently sports-related and are associated with considerable morbidity if unrecognized and untreated. In the present study, two patients were found to have SLAP lesion on arthroscopy. Both of them were correctly diagnosed on MRI.
In the end, specificity may be more important to the radiologist in his or her relationship with the referring orthopedic surgeon. It is not difficult to know that a labrum is abnormal and therefore in need of debridement. The ability to distinguish between various labral lesions, however, supplies the surgeon with a roadmap and engenders the confidence of our referral base.(23)

CONCLUSIONS

The most common pathology causing shoulder pain is rotator cuff disease. MRI is the most appropriate screening tool before arthroscopy. It is preferable to diagnostic arthroscopy in most patients because it avoids surgical risks. Also concerning the economic burden especially in a country like India, MRI may decrease unjustified arthroscopies.
MRI is non-invasive and combines soft tissue contrast with tomographic possibilities without the use of ionizing radiation. It can visualise both superficial and deep structures and can delineate bone, cartilage, ligaments with high precision. It also helps in classification and pre-operative assessment of the pathology.
MRI is also useful in assessment of anatomical variants, underlying predisposing factors and secondary changes associated with shoulder joint pathologies. MRI is routinely used investigation in shoulder joint pathologies and has very high sensitivity in detecting rotator cuff and labroligamentous injuries. MRI is also used for diagnosis of tendinosis and SLAP lesions. However, study in a large sample size yields better results.

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