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MRI Assessment of an Aching Shoulder

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Abstract: *Magnetic resonance imaging (MRI) is playing an increasingly important role as an non-invasive test for determining the patients of shoulder pain.*
Aims and Objectives:To assess the role of MRI in the diagnosis and detection of shoulder pain.
Results: Among the 100 patients included in the study joint effusion (64%) is the most common pathology, followed by rotator cuff tears (50%), tendinopathy (46%), degenerative diseases(42%) and bursitis(34%). Hill Sachs lesion was observed in 20% patients while Bankarts lesion / Variants in 24% patients. Malignant tumor was present in 1 patient.
Conclusion: We recommend the state-of-the-art conventional MRI, be performed in shoulder pathologies in patients with aching shoulder as it is non-invasive, non-ionizing radiation, high degree of resolution and good soft tissue contrast.
Key Words*: MRI, Shoulder*

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I. Introduction

Painful shoulder is a common condition among patients. Apart from acute trauma inflicting lesions like fractures, dislocations, contusions, sprains and burst tendons, painful shoulder is also seen because of adhesive capsulitis, acute or chronic calcific tendinitis, bursitis, bicipital tendinitis and lesions of musculotendinous rotator cuff. [1]

Shoulder pain leads to disability and prevents the patient's normal activity including the ability to work. Posing as a substantial socioeconomic burden. The shoulder is complex in its anatomical structure and functioning. The etiology of shoulder pain is diverse and many disorders present with similar symptoms and signs. [2, 3, 4]

Most shoulder pains exacerbate with elevation of the arm or overhead activities. [5, 6]

Mostly etiology and findings on evaluation are common making diagnosis and further treatment difficult. MRI provides good multiplanar delineation even without contrast and absence of radiation hazards. In addition to detailed information regarding cuff defects, additional information about adjacent structures, size of muscle, cross-sectional area, and fatty degeneration are also acquired. [7]

Hence, the study was designed to assess the role of MRI in the assessment of causes of shoulder pain.

OBJECTIVES

1. To assess the role of MRI in the diagnosis and detection of shoulder pain.

MATERIALS AND METHODS

STUDY DESIGN & POPULATION:

The present study was descriptive cross sectional study under taken to evaluate the role of MRI in the determining the causes of shoulder pain in a tertiary care center where both indoor and outdoor patients being referred to department of Radiology at our institute with complaint of shoulder pain.

All the study patients were investigated on 1.5 Tesla GE 360 optima MRI machine.

INCLUSION CRITERIA:

1. History of pain in shoulder joint.
2. History of trauma to shoulder joint.
3. Clinically suspected to have either a rotator cuff injury (full thickness or partial thickness tears), biceps tendon injury, calcific tendinitis, fractures or any other condition causing shoulder pain.

EXCLUSION CRITERIA:

1. Patients with aneurysmal clips.
2. Patients with metallic implants, cardiac pacemakers, cochlear implants.
3. Patients who are claustrophobic.
4. Patient who are unwilling for imaging.

II. Observations and results

Tables

Table 1: Age distribution

Age group (years)	No. of Patients	Percentage
0-20	05	05.00
21-40	31	31.00
41-60	44	44.00
61-80	20	20.00
Total	100	100

The maximum number of patients were in the age group of 41-60 years (44%), followed by 21-40 years (31%). The mean age among patients was 45.34 ±16.10years.

Table 2: Gender distribution

Gender	No. of Patients	Percentage
Male	72	72.00
Female	28	28.00
Total	100	100

The maximum numbers of patients were male (72%), followed by females (28%).

Table 3: Distribution according to side affected

Side	No. of Patients	Percentage
Right	60	60.00
Left	40	40.00
Total	100	100

The maximum number of patients had affected right side (60%), followed by left (40%).

Table 4: Distribution according to Lesions by MRI findings

Pathology	No. of Patients (n=100)	Percentage
Adhesive Capsulitis	5	05.00
Tendinopathy	46	46.00
Bursitis	34	34.00
Synovitis	4	04.00
Rotator Cuff Tears	50	50.00
Impingement Syndrome	1	01.00
Hill-Sachs	20	20.00
Bankarts /Variants	24	24.00
Bone Bruise /Contusion/Edema	6	06.00
Fractures	5	05.00
Joint Effusion	64	64.00
Degenerative Diseases	42	42.00
Cysts	8	08.00
Infection	1	01.00
Benign Tumors	2	02.00
Malignant Tumors	1	01.00

The lesions in the present study were joint effusion (64%), followed by rotator cuff tears (50%), tendinopathy (46%), degenerative diseases (42%) and bursitis (34%). Hill Sachs lesion was observed in 20% patients while Bankarts lesion/Variants in 24% patients. Malignant tumor was present in 1 patient.

III. Discussion

In the present study, the age distribution among patients showed maximum number of patients were in the age group of 41-60years (44%), followed by 21-40years (31%). The mean age among patients was 45.34 ±16.10 years. The maximum number of patients were male (72%), followed by females (28%) in our study.

Elisabeth Kvalvaag et al [8] study on shoulder MRI observed the mean age of patients was 47years, there were 62 women and 53 men.

Safaa Aboelkaseem Mohamed et al [9] evaluated the role of MRI in shoulder pain observed their ages ranged between 19-69 years with mean age of 31years, 56 were males and 44 females with slight male predominance.

Hema Chaudhary et al [10] in a study on MRI evaluation of shoulder joint observed average age of 42.28 years among patients, 54 were men and 27 were women.

Pankaj Chaudhari[11] demonstrated the role of MRI in detecting shoulder pathologies encountered in patients of shoulder pain. Out of the 40 patients the age of the patients is between (18 - 80) years. 28 (70%) were Males and 12 (30%) were females

Amandeep Singh et al [12] studied role of MRI in evaluation of patients with shoulder pain observed a total of 50 patients with age ranging from 15 to 65 years. The majority of patients belonged to the age group between 56 and 65 years, comprising 36% of all patients. Men (56%) outnumbered women (44%)

Ram H et al[13] studied the role of magnetic resonance imaging in diagnostic evaluation of shoulder pathologies in whom the mean age of the population was 46.6 years in which 28 males (56%) and 22 females (44%) were affected.

Safaa Aboelkaseem Mohamed et al [9] to evaluate the role of MRI in shoulder pain observed out of 100 patient, 79 patients suffered right shoulder pain while 21 had left side pain.

Amandeep Singh et al [12] studied role of MRI in evaluation of patients with shoulder pain observed the right shoulder was involved in the majority of patients (77%).

The lesions in the present study were joint effusion (64%), followed by rotator cuff tear (50%), tendinopathy (46%), degenerative diseases (42%) and bursitis (34%). Hill Sachs lesion was observed in 20% patients while Bankarts lesion in 24% patients. Malignant tumor was present in 1 patient.

In a study by Safaa Aboelkaseem Mohamed et al [9] to evaluate the role of MRI in shoulder pain observed out of 100 patients, acromioclavicular joint osteoarthritis was the most common pathologic finding (85%) followed by supraspinatus tendinosis (45%). Biceps tenosynovitis (3%) and SLAP tears (7%) were the least common.

Ram H et al [13] studied the role of magnetic resonance imaging in diagnostic evaluation of shoulder pathologies out of 50 patients, Rotator cuff disease was seen in 88% of cases, followed by traumatic injuries (46%)making it the most common pathology and least common being infective (10%).

Hill Sachs lesion was observed in 20% patients while Bankarts lesion in 24% patients.

The majority of cysts were observed as Humeral Cysts (75%), followed by Paralabral Cysts (25%).

Enarthrodial shoulder joint MRI has achieved wide acceptance as an imaging technique. This was ab initio thanks to the sensitivity and specificity of MR Imaging in detecting rotator cuff pathologies. Evaluation of subtle humeral head changes, articular cartilage, synovial or labral pathology may require additional sequences & intravenous or intra articular gadolinium. Early changes in articular cartilage/ body part gristle is also an additional evident with fat suppressed T2 weighted fast spin echo sequences. MRI is very sensitive to alterations in the bone marrow and fluid in joint space area that may represent pathology occult to plain radiography and bone scintigraphy of shoulder. MRI may be a sensible, well accepted and accurate non-invasive imaging technique in patients presenting with shoulder pain and is imaging modality of choice when clinical examination is suspect of shoulder sickness and plain radiographs square measure traditional or equivocal. Affordable, improved comprehensive visualization of the enarthrodial shoulder joint in a noninvasive manner by MRI. Excellent soft tissue distinction and multiplanar acquisition offer best optimal assessment of muscle, tendons, hyaline and fibrous cartilage, joint capsules, fat, bursae and bone marrow.

IV. Conclusion

Magnetic resonance imaging (MRI) of the shoulder joint has achieved wide acceptance as an imaging technique for the sensitivity and specificity of MRI in the evaluation of painful shoulder with or without trauma. Its non-invasive nature, lack of contrast exposure, nonionizing radiation, high degree of resolution, the ability to evaluate multiple potential pathologic processes with excellent contrast of the soft tissues and the multiplanar acquisition provide an optimal evaluation of the muscles, tendons, hyaline and fibrous cartilage, joint capsules, fat, bursae and bone marrow. We recommend the state-of-the-art conventional MRI, be performed in shoulder pathologies in patients with aching shoulder.

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FIGURES

FIGURE NO. 1- Sagittal STIR image showing Subacromial Subdeltoid Bursitis with Gleno-humeral joint effusion.

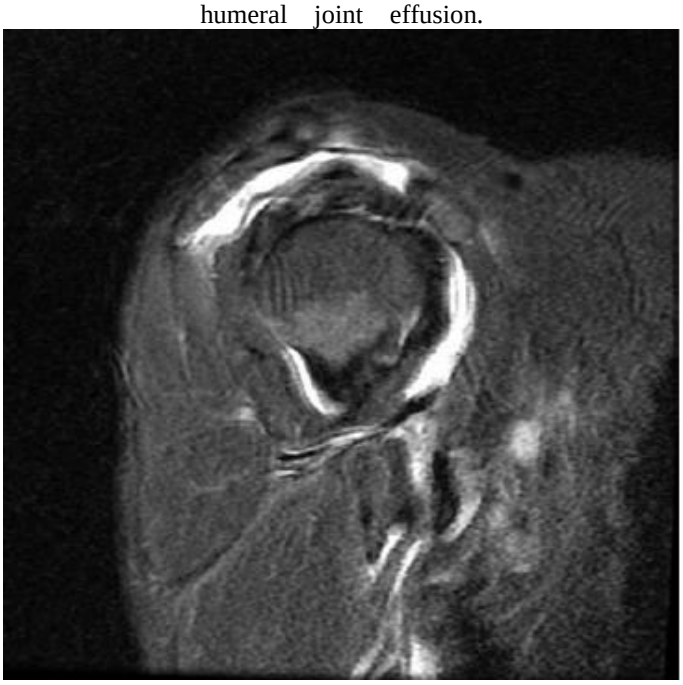

FIGURE NO. 2- Coronal STIR image showing Hill Sach's lesion.

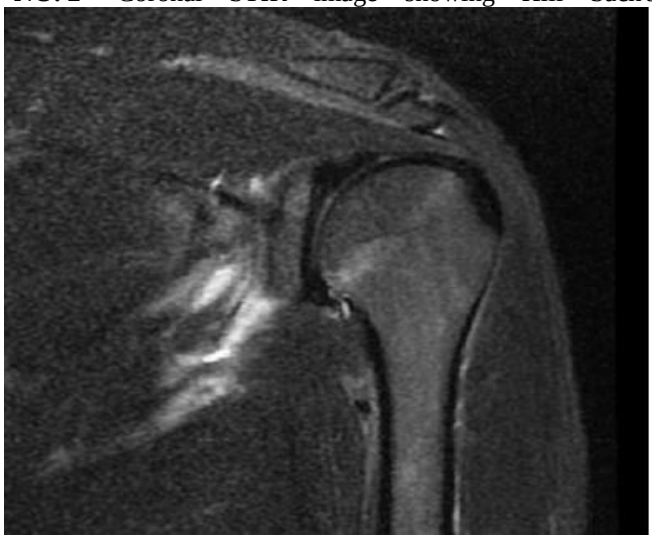

FIGURE NO. 3- Coronal STIR image showing Bruise/Contusion at greater tubercle of humerus extending into meta-diaphyseal region

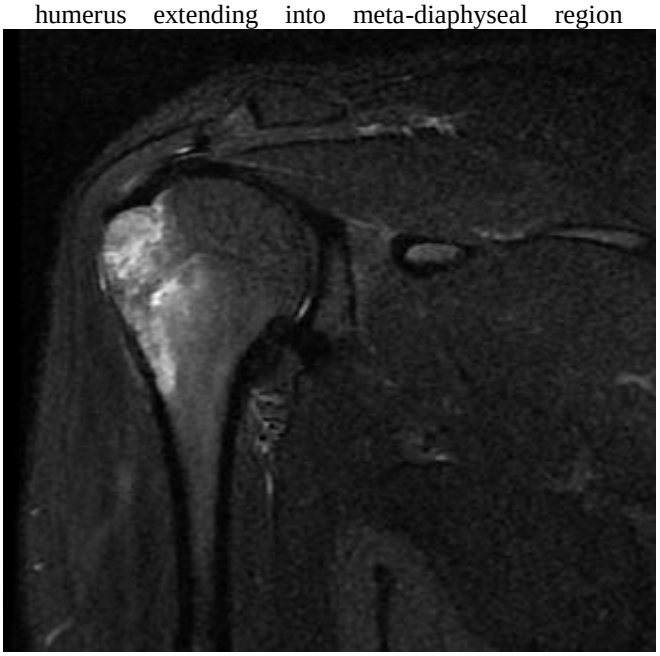

FIGURE NO. 4-Coronal T2WI showing complete tear of Supraspinatus with retracted tendon fibres & atrophy of the muscle.

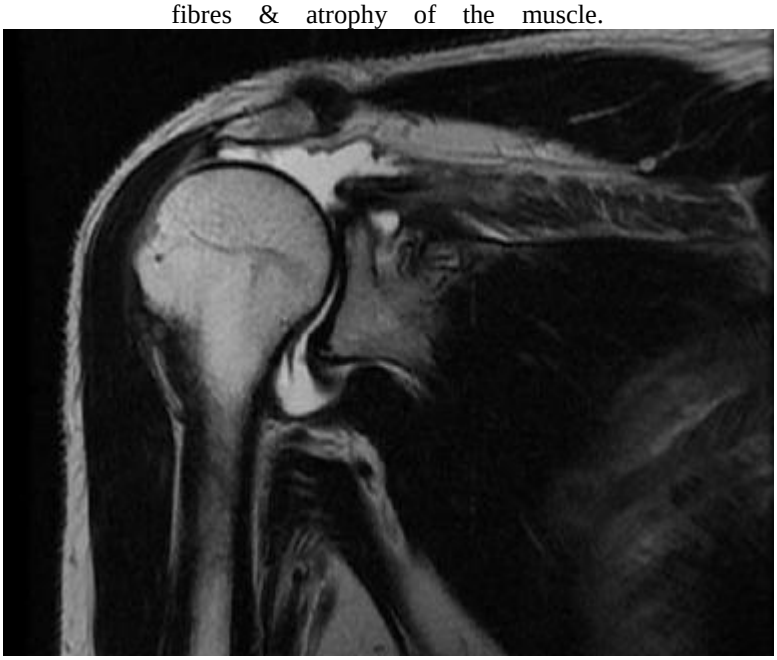

FIGURE NO. 5-Coronal T1WI (a), T2WI (b) and T1 FS post contrast image (c) showing Osteosarcoma involving the humeral head.

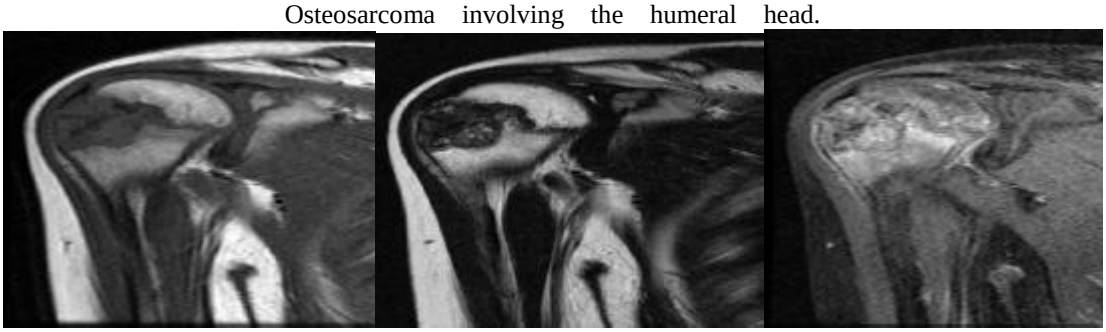

FIGURE NO. 6-Coronal T2WI showing Osteomyelitis of upper humerus metaphysis in the region of bicipital groove causing anterior cortical destruction along with surrounding soft tissue edema.

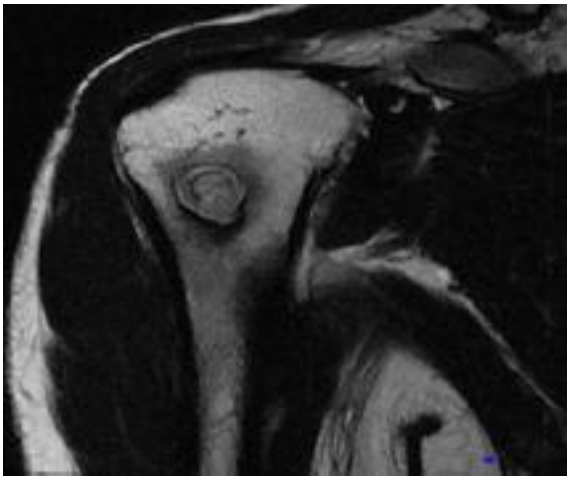

FIGURE NO. 7- Coronal T1WI showing undisplaced fracture of greater tuberosity of humerus.

FIGURE NO. 8-Axial PD fat sat image showing Paralabral cysts with Biceps tendinosis.