



ROLE OF MRI IN EVALUATION OF SHOULDER PAIN

Dr.Pankaj Chaudhari

Resident, 304/5, SadhanaDarshanChs,Kopar road,Near kopar station, Dombivli (west) 421202.

Dr.Ashutosh Chitnis

Professor, 601 SHANKAR THAKUR SADAN, PLOT-21 22 23, SEC-20, NERUL (W) NAVI MUMBAI-400706.

ABSTRACT

INTRODUCTION: Magnetic resonance imaging (MRI) has played an increasingly important role as a noninvasive test for determining the patients of shoulder pain which may benefit from surgery.

AIM AND OBJECTIVES: The study is done to demonstrate the role of MRI in detecting shoulder pathologies encountered in patients of shoulder pain.

METHODS: The study included 40 patients referred for MRI Shoulder after a detailed clinical workup. Images were acquired using various non-contrast enhanced sequences and were analyzed for pathologies.

RESULTS: Out of the 40 patients 8 patients were excluded. Among the 32 patients included in the study the various pathologies were detected on MRI.

DISCUSSION: MRI is the preferred test for evaluating impingement syndrome and rotator cuff pathology.

CONCLUSION: MRI is a non-invasive, lack of contrast exposure, nonionizing radiation, high degree of resolution mode of imaging.

KEYWORDS

Shoulder, Magnetic resonance Imaging, Impingement, Rotator cuff.

INTRODUCTION

Shoulder pain is a common problem that pose difficult diagnostic and therapeutic challenges. It is the third most common musculoskeletal complaint in the general population, and accounts for 5% of all musculoskeletal consultations. It is second only to knee pain for referrals to the Orthopaedics or general

Patients younger than 30 yrs. old tend to have mild inflammatory or bio-mechanical causes for their pain such as atraumatic instability, tendinosis and arthropathy.

The major cause of shoulder pain in patients older than 40 years is rotator cuff impingement and tears. With the development of new arthroscopic techniques for treating rotator cuff disorders, magnetic resonance imaging (MRI) has played an increasingly important role as a noninvasive test for determining which patients may benefit from surgery.^[1,2,3,4]

The rotator cuff is the most commonly affected structure in the shoulder, and sub acromial impingement syndrome is the leading cause of rotator cuff injury.^[5,6,7,8,9]

The present study was done to see the different pathologies of shoulder seen on MRI in patients of shoulder pain who were referred for MRI in the Radiology Department of MGM Hospital, Kamothe, Navi Mumbai.

AIM AND OBJECTIVES

- To evaluate the patients presenting with shoulder pain using MRI at Navi Mumbai.
- To understand the common pathologies of shoulder encountered on MRI in Navi Mumbai.

MATERIALS AND METHODS

Source of data: The main source of data for this study were the 40 patients referred for Shoulder MRI to the Department of Radiology, MGM Hospital, Kamothe, Navi Mumbai.

Method of collection of data:

Definition of a study subject: Adult patients presenting with Shoulder pain referred to the Department of Radiology, MGM

Medical College & Research Hospital Navi Mumbai for MRI.

The method of study consists of: A structured pre-prepared preformat containing the patient details, clinical history, physical examination and investigations who meet the inclusion criteria were prepared and patients were subjected to MRI Shoulder using 0.3T Centurion imaging

Patient preparation : No specific preparation was required for the examination.

DURATION OF STUDY: Study was conducted over a period of six months from June 2016 to November 2016.

PROTOCOL:

MRI of the Shoulder was performed using 0.3T Centurion imaging system. The sequences used were—AXIAL T1W, AXIAL T2W, AXIALPD, CORONAL OBLIQUE STIR, CORONAL OBLIQUE PD, SAGITTAL OBLIQUE T2.

No medication/IV contrast were used in the study.

INCLUSION CRITERIA

- All patients with Shoulder pain referred to Radiology Department of MGM Hospital & Research Centre, Kamothe, Navi Mumbai for Shoulder MRI.
- Both genders were included in the study.
- Adults between 18 and 80 years of age.

EXCLUSION CRITERIA

- Patients below 18 and above 80 years of age.
- Patients with known history of malignancy.
- Patients with previous operative history over Shoulder.
- Patients who has contraindications for MRI like pacemaker, metallic implants, claustrophobia etc.

OBSERVATIONS AND RESULTS

The age of the patients is between (18 - 80) years 28 (70%) were Males and 12 (30%) were Females. Out of the 40 patients 8 patients were excluded due to various reasons. Among the 8 patients excluded 5 were males and 3 were females.

Among the 32 patients included in the study the various pathologies detected on

MRI are tabulated below-

MRI PATHOLOGY	MALES	FEMALES	TOTAL
PARTIAL ROTATOR CUFF TEARS	5	2	7
COMPLETE ROTATOR CUFF TEARS	3	1	4
SUBACROMIAL IMPINGEMENT SYNDROME	4	-	4
ADHESIVE CAPSULITIS	3	2	5
ACUTE BURSTITIS	1	-	1
LABRAL TEARS	2	2	4
ACROMIO-CLAVICULAR JOINT ARTHROPATHY	2	1	3
BICEPS TENDONITIS	3	1	4
TOTAL	23	9	32

TABLE 1: DISTRIBUTION OF ABNORMALITIES AMONG 32 PATIENTS ON MRI.

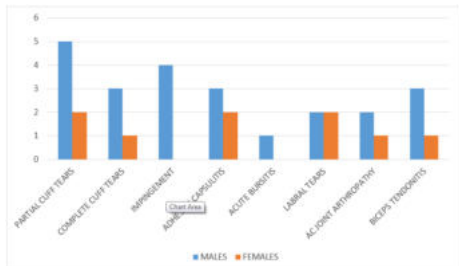


CHART 1: CHART SHOWING DISTRIBUTION OF ABNORMALITIES AMONG 32 PATIENTS.

ILLUSTRATIVE CASES

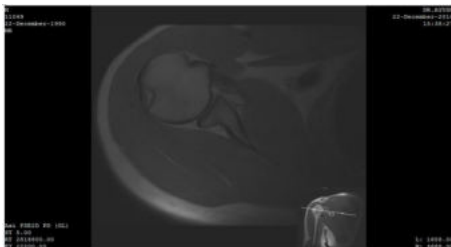


FIG. 1:HILL SACHS LESION AT SUPEROLATERAL ASPECT OF HUMERAL HEAD.

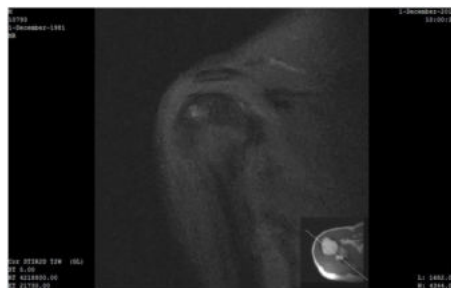


FIG.2: BONE EDEMA IN HUMERAL HEAD.



FIG.3: PARTIAL TEAR OF BICEPS TENDON



FIG. 4: ACROMIO-CLAVICULAR JOINT ARTHROPATHY.

DISCUSSION

Magnetic resonance imaging is the preferred test for evaluating impingement syndrome and rotator cuff pathology. A normal MRI greatly reduces the chances of a rotator cuff tear, with a negative likelihood ratio of 0.08.[11, 12, 13]

Magnetic resonance imaging is also useful in the evaluation of avascular necrosis, biceps tendon disorders, inflammatory processes, and tumours.[14].The diagnosis of labral lesions can be challenging given the relatively low sensitivity and negative predictive value noted in several trials.[15,16]

For many orthopaedic surgeons, the main role of shoulder MRI is to detect a full-thickness rotator cuff tear (RCT). The most common appearance of a full-thickness tear is high signal intensity on a T2-weighted image that extends from the articular surface of the rotator cuff to the sub acromial-subdeltoid bursa. In chronic RCTs in which the shoulder joint has little or no effusion, the humeral head may be high riding, such that not much high signal is seen at the tear site. Some patients may also develop fibrous thickening of the sub acromial-subdeltoid bursa, which can mimic an intact tendon in the absence of an effusion; therefore, it is important to trace a low-signal structure as it passes over the humeral head. Rotator cuff fibres will end at their insertion on the greater tuberosity, whereas fibrous thickening of the bursa will continue deep to the deltoid muscle below the greater tuberosity.

Partial-thickness tears can be classified as articular, bursal, or intratendinous. Intratendinous tears may be a cause of shoulder pain, but they are not observed at routine arthroscopy and are rarely treated surgically. Articular-surface partial-thickness tears are more common than bursal-surface tears (at an approximately 3:1 incidence rate).[17]

False positives/negatives

There are 3 other abnormalities of the rotator cuff that can mimic an RCT: degeneration, tendinopathy, and cuff strain. Rotator cuff degeneration is common in older individuals and appears as an ill-defined area of increased signal on T2-weighted MRIs within the substance of the cuff.

Tendinopathy, occasionally incorrectly termed tendinitis, is a related intratendinous process that is histologically similar to rotator cuff degeneration. Although the term tendinopathy is occasionally used interchangeably with age-related cuff degeneration, some clinicians reserve the term for younger symptomatic patients.[18]

As with patellar "tendinitis," tendinopathy is not truly an inflammatory process, because there is no edema, vascular invasion, or acute inflammatory cells. Instead, what occurs pathologically is severe mucoid and eosinophilic degeneration with intratendinous clefts, often causing focal tendon swelling and, occasionally, surface fibrillation. If windowed incorrectly during imaging, tendinopathy can also appear to extend to involve the surface of the rotator cuff.[18]

Rotator cuff strain after acute trauma has been described as another potential cause of increased intratendinous signal on MRI. This typically occurs in younger patients (< 35 y) who have an associated bone bruise and focal increased signal intensity in the

posterior aspect of the supraspinatus tendon, as distinguished from cuff degeneration, which involves a larger area that is centered in the anterior critical zone. Patients with presumed rotator cuff strain as demonstrated on MRI are less likely to require surgery than older patients who develop shoulder pain after acute trauma.[18]

In summary, fat-suppressed, FSE, T2-weighted images obtained with a quality shoulder coil are accurate for diagnosing RCTs. False-negative full-thickness tears typically occur when the patient does not have an effusion and when the subdeltoid bursal capsule is thickened. False-negative partial-thickness tears are fairly common, especially for tears that are not very deep. Failure to diagnose partial-thickness tears can be minimized by radiologists carefully inspecting the low-signal surfaces of the rotator cuff and noting whether the low-signal surface layers are disrupted, as well as by use of both intra-articular and IV gadolinium to enhance the conspicuity of these lesions.[18]

CONCLUSION

Magnetic resonance imaging has become the gold standard for diagnostic imaging of the shoulder related to soft tissue injury. The advantages include its non-invasive nature, lack of contrast exposure, nonionizing radiation, high degree of resolution, and the ability to evaluate multiple potential pathologic processes. [10]

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