

THE STUDY OF MRI FINDINGS IN TRAUMATIC AND NON TRAUMATIC LESIONS THAT CAUSE SHOULDER JOINT PATHOLOGY

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Abstract

Background: After neck and low back pain, shoulder discomfort is the most frequent musculoskeletal complaint, and it has been linked to impairment and obvious disability. Up to 20% of people will experience shoulder issues at some point in their lives. Physical examination, however, is insufficient on its own. Therefore, a variety of imaging techniques must be used to support the diagnosis. In order to diagnose articular as well as periarticular diseases of the shoulder joint, a variety of imaging modalities including plain radiography, ultrasonography, computed tomography, CT arthrography, MRI, and MR arthrography are essential. **Materials and Methods:** The radio diagnostic division of the G.R. Medical College and the J.A Group of Hospitals collaborated on this prospective study for a year in Gwalior (M.P.) with the Vidya MRI Center. Patients with shoulder joint issues from a variety of age groups who were referred to Vidya MRI were included in the study. The trial included a total of 70 participants with symptoms of the unilateral shoulder. The symptomatology of the patient was considered when the MRI pictures were being analyzed. **Result:** Most of the patients were between the ages of 31 and 60. Males 41 (58.60%) had a higher prevalence of shoulder joint involvement than females 29 (41.40%). 33% of the entire patient population under study has a trauma component. Compared to full thickness tears (26.80%), partial thickness tears are more frequent (73.10%). **Conclusion:** The findings demonstrated that MRI can be a valuable tool for excluding potential shoulder problems and for providing hints about the most likely diagnosis. Finally, MRI has great specificity and sensitivity.

INTRODUCTION

Conditions that cause shoulder pain are common and significantly increase the community's musculoskeletal morbidity. According to reports, the prevalence of shoulder diseases in the general population ranges from 7% to 36%. In primary care, shoulder pain is the third most frequent musculoskeletal complaint, and every year, 1% of adults with new shoulder discomfort visit a general practitioner.^[1]

Shoulder pain can be extremely painful, uncomfortable, and impair one's ability to carry out regular tasks. It ranks third among the causes of musculoskeletal consultations, with an estimated incidence of 16–26%. A variety of intraarticular and extraarticular disorders, such as rotator cuff tears, labral injuries, adhesive capsulitis, impingement syndrome, and instability, are among the shoulder

diseases. It is crucial to deal with such cases with appropriate diagnosis and treatment because they greatly interfere with everyday activities and the person's and family's ability to earn a living. To assess pathologic disorders of the shoulder, a variety of imaging modalities are currently used, including conventional radiography, fluoroscopy, sonography, nuclear medicine, and MRI (Magnetic Resonance Imaging).^[2]

Numerous attempts have been made to categorize the acromion's morphologic appearance on routine radiographs because acromion morphology has been linked to shoulder diseases. Although Bigliani et al. (acromion type) and Aoki et al. (acromial tilt) described the anatomical shape of the acromion, more recent studies have reported the lateral extension, which includes the lateral acromial angle (LAA), the acromion index (AI), and the critical shoulder angle (CSA). According to Bigliani et al.,

hooked (type-III) acromions are more likely to cause rotator cuff tears (RCT) than curved (type-II) or flat (type-I) acromions.^[3]

A total of 16 percent of musculoskeletal complaints are related to the shoulders, and there are 15 new episodes per 1,000 patients who visit a primary care physician each year. This two-part article will give the primary care doctor a quick, accurate method for diagnosing chronic shoulder conditions such rotator cuff pathology, adhesive capsulitis, acromioclavicular osteoarthritis, glenohumeral osteoarthritis, and instability. The therapy options for persistent shoulder discomfort are covered in Part II of this issue of AFP and are in line with the most recent evidence-based recommendations. Whether or not the patient has previously sought therapy, shoulder discomfort is considered chronic when it persists for more than six months.^[4]

The astonishing and impressive advancements of arthroscopy and magnetic resonance imaging (MRI) made over the past three decades have led to higher accuracy of diagnosis, despite the initial difficult interpretation of normal and abnormal data to evaluate the shoulder joint. This result was made possible by the collaboration of arthroscopic shoulder surgeons and radiologists, who shared clinical insights and patient feedback. To this day, there are still glaring discrepancies between radiologists' and surgeons' assessments of MR imaging of the shoulder. Given that designing patient treatment procedures often involves the use of imaging modalities like MRI, it is critical to understand how accurate, reliable, and useful these operator-dependent imaging reports are. In order to compare the results with arthroscopy, the gold standard for identifying interarticular and subacromial shoulder abnormalities.^[5]

MATERIALS AND METHODS

This prospective study was carried out for a year in partnership with the Vidya MRI Center in Gwalior (M.P.), by the radio diagnosis department of the G.R. Medical College and the J.A Group of Hospitals. The study comprised patients from a range of age groups

who had been referred to Vidya MRI with shoulder joint problems. A total of 70 participants with unilateral shoulder complaints were enrolled in the trial. A thorough history and pertinent clinical examination were used to screen every patient. Investigations that were ancillary were conducted as needed. Short explanations of the operation were given to the patients. It was made sure that there were no objects that would interfere with magnetic resonance imaging, such as pacemakers, metal implants, shrapnel from drug infusion devices that had been placed, ferromagnetic prosthetic valves, aneurysm clips, etc. MRI was conducted on a GE 0.2 Tesla SIGNA PROFILE permanent magnet unit. To lessen motion artifact, shoulder stabilization was crucial. Motion results from a combination of the subject's modest voluntary movements and breathing. The patient's symptomatology was taken into consideration whilst the MRI images were being examined. An MRI diagnosis was determined based on abnormal results that were identified. Various MRI shoulder projects include: -detection of full-thickness rotator cuff injuries; -evaluation of impingement syndromes (coronal oblique views) and, less frequently, glenoid disease (transaxial views).

Inclusion Criteria

Any shoulder discomfort cases where an MRI is a tool for determining the cause.

Exclusion Criteria

Post-operative situations.

MR imaging contraindications.

RESULTS

[Table 1] show the maximum no of patients were in the age group of 31-60 years.

[Table 2] shows shoulder joint involvement was more common among males 41 (58.60%) as compare to females 29 (41.40%).

[Table 3] shows that trauma contribute to 33% of total patients population studied.

[Table 4] shows partial thickness tears are more common (73.10%) as compare to full thickness tears (26.80%).

Table 1: Age & sex distribution of painful shoulders

Age in years	Male		Female		Total	
	NO.	%	NO.	%	NO.	%
11 - 20	1	2.4	0	0	1	1.4
21 - 30	6	14.6	3	10.34	9	12.86
31 - 40	10	24.4	9	31	19	27.1
41 - 50	12	29.3	10	34.4	22	31.4
51 - 60	8	19.5	6	20.6	14	20
61 - 70	2	4.87	1	11.1	3	4.28
71 - 80	2	4.87	0	0	2	2.86
Total	41	100	29	100	70	100

Table 2: distribution of cases according to sex

Sex	Number of patient	Percentage
Male	41	58.6%
Female	29	41.4%
Total	70	100%

Table 3: distribution of cases according to trauma

Cases	No. Of patients	Percentage
Non-traumatic shoulder	47	67
Traumatic shoulder	23	33
Total	70	100

Table 4: distribution of cases according to thickness of tendon involved

Rotator cuff tear	Number of tears	Percentage
Partial thickness	30	73.1%
Full thickness	11	26.8%
Total	41	100%

DISCUSSION

To study shoulder pathology, participants had an MRI scan of their non-dominant shoulder. Because it may be less susceptible to degenerative changes brought on by job or recreational activities, the non-dominant side was put to the test. According to Boninger et al. (2001), the MRI procedure was created specifically to identify rotator cuff disorders. A radiologist examined the MRI scans for signs of distal clavicular edema, acromioclavicular degenerative joint disorder (ACDJD), AC edema, acromial edema, subacromial osseous spur formation, enthesal edema, coracoacromial (CA) ligament edema, and CA ligament thickening.^[6]

The burden and perception of sickness are key components in functional shoulder instability (FSI). Patients with positional or non-positional FSI that may be controlled frequently do not experience any symptoms, and as a result, they do not perceive their "condition" as pathologic but rather as an improved skill. As a result, it is probable that many individuals with controlled FSI may not even seek medical attention, which is another reason why these patients are undoubtedly underrepresented in this study. In fact, rather than due to the patient's genuine complaints, some teenagers were brought to our attention by their parents who were concerned about their child's "abnormal" shoulder movements.^[7]

Two categories of the shoulder MRI's effects on clinical diagnosis and therapy were taken into consideration. When the major clinical diagnosis changed according to the MRI (e.g., from rotator cuff disease to glenohumeral instability), the treatment category shifted from operational to nonoperative, or vice versa, and this is referred to as a category one change. When a significant anatomical abnormality was discovered on the MRI that was clinically significant but did not alter the primary diagnosis but did affect the secondary diagnosis and/or treatment strategy (additional discovery of a full-thickness subscapularis tear when only a full-thickness supraspinatus tear was diagnosed), this was referred to as a category two change.^[8]

Scans using magnetic resonance imaging (MRI) are frequently performed to look at shoulder issues. The American College of Radiology guidelines from 2010 advise using plain radiographs as the cornerstone of investigations when looking into acute shoulder pain. They come to the conclusion that MRI

arthrogram (MRA) should be employed in cases of suspected instability and that ultrasound scan (USS) is just as effective as MRI in identifying cuff pathology.^[9]

The complicated architecture of the shoulder joint makes it difficult for radiologist and orthopedic practitioners to image the shoulder and its dysfunction. Due to its non-invasiveness, high degree of resolution, absence of contrast exposure and non-ionizing radiation, multiplanar capabilities, and exceptional soft tissue resolution, magnetic resonance imaging (MRI) played a significant role as a non-invasive examination.^[10]

CONCLUSION

The findings demonstrated that MRI can be a valuable tool for excluding potential shoulder problems and for providing hints about the most likely diagnosis. Finally, MRI has great specificity and sensitivity. It is non-intrusive and ionizing radiation-free. Due to its multiplanar capacity and superior soft tissue resolution, magnetic resonance imaging is a highly helpful modality for the examination of the shoulder. MRI changes the initial diagnosis in situations and affects how patients are managed.

REFERENCES

1. Levent Bayam, MBBS, MRCS, Mudassar A. Ahmad, MBBS, MRCS, Syed Z. Naqui, BSc, MSc, FRCS(Tr & Orth), Aroonkumar Chouhan, BSc (Hons), MBChB, and Lennard Funk, BSc, MBBCh, FRCS, MSc, FRCS (Tr & Orth) Pain Mapping for Common Shoulder Disorders. *Am J Orthop.* 2011; 40(7):353-358.
2. Abhinav Bhatnagar, Sachin Bhonsle, and Sonu Mehta. Correlation between MRI and Arthroscopy in Diagnosis of Shoulder Pathology. *J Clin Diagn Res.* 2016 Feb; 10(2): RC18-RC21.
3. Heuberer et al. Critical shoulder angle combined with age predict five shoulder pathologies: a retrospective analysis of 1000 cases. *BMC Musculoskeletal Disorders.* 2017; 18:259.
4. KELTON M. BURBANK, MD, J. HERBERT STEVENSON, MD, GREGORY R. CZARNECKI, DO, AND JUSTIN DORFMAN, DO. Chronic Shoulder Pain: Part I. Evaluation and Diagnosis. *Am FAM Physician.* 2008; 77(4):453-460.
5. Omid R Momenzadeh, MD, Mohamad H Gerami, MD, Sepideh Sefidbakht, MD, and Sakineh Dehghani, MD. Assessment of Correlation between MRI and Arthroscopic Pathologic Findings in the Shoulder Joint. *Arch Bone Jt Surg.* 2015 Oct; 3(4): 286-290.
6. Jennifer L. Mercer, Michael Boninger, Alicia Koontz, Dianxu Ren, Trevor Dyson-Hudson, Rory Cooper. Shoulder joint

- kinetics and pathology in manual wheelchair users. *Clinical Biomechanics* .2006; 21: 781–89.
7. Philipp Moroder, MD, Victor Danzinger, Nina Maziak, MD, Fabian Plachel, MD et al. Characteristics of functional shoulder instability. *J Shoulder Elbow Surg.* 2020; 29: 68–78.
 8. JOSEPH P. IANNOTTI MD, PHD, and GERALD R. WILLIAMS, MD. CLINICAL IMPACT OF SHOULDER MAGNETIC RESONANCE IMAGING. *Operative Techniques in Sports Medicine.* 1997; 5(1): 15-18
 9. Richard Freeman & Sanjay Khanna & David Ricketts. Inappropriate requests for magnetic resonance scans of the shoulder. *International Orthopedics' (SICOT)* 2013; 37:2181–2184
 10. Hari Ram, Ravinder Kumar. Diagnostic evaluation of magnetic resonance. Imaging in shoulder pathologies. *International Journal of Medical Science and Public Health.* 2018; 7(9): 691-96.