

Original article:

A study of clinical radiological and arthroscopic correlation in various shoulder pathologies

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Abstract:

Introduction: Shoulder pain is one of the most common complaint in medical practice and often leads to significant disabilities. The prevalence of shoulder pain has been reported to range from 7% to 14% in the overall population. The initial evaluation of shoulder disorders usually consists of taking clinical history and performing a physical examination, which includes various manipulative tests.

Material and methods: A clinical diagnosis was made in patients presenting to OPD with shoulder complaints which were based on a standard shoulder examination protocol. Clinical diagnosis and MRI findings were confirmed by arthroscopy. This is a prospective study, which includes patients with various intra articular shoulder disorders symptoms.

Results: Clinical examination in Rotator cuff tears have Sensitivity of 78%, Specificity 67%, Positive predictive value 87%, Negative predictive value 50% and Accuracy of 75% compared to Arthroscopy.

MRI findings in Rotator cuff tears have Sensitivity of 100%, Specificity 67%, Positive predictive value 90%, Negative predictive value 100% and Accuracy of 92% compared to Arthroscopy.

Conclusion: Diagnostic Arthroscopy is the gold standard and clinical & radiological examinations are compared with arthroscopy. The sensitivity and specificity for all pathologies is higher for arthroscopy in our study as compared to clinical and MRI examinations, as is the observation of most workers in this field.

Introduction:

Shoulder pain is one of the most common complaint in medical practice and often leads to significant disabilities. The prevalence of shoulder pain has been reported to range from 7% to 14% in the overall population. The initial evaluation of shoulder disorders usually consists of taking 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 therefore in these patients a through physical examination is difficult. In this situations MRI is the most comprehensive and commonly used modality to evaluate the shoulder disorders.¹

In recent years MRI replaced other techniques for evaluating Shoulder disorders by its non-invasiveness and

highly accurate early evaluation of soft tissue pathology by its additional benefit of its ability to image shoulder in any Orthogonal or Off-axis oblique plane.²

Most commonly patients are referred for Shoulder MRI because of Suspected Rotator cuff tears, Sub acromial impingement syndrome, Glenohumeral joint instability (Recurrent dislocation of Shoulder), Biceps tendon abnormalities (example Superior labrum anteroposterior lesions), Infections or inflammatory disorders, Degenerative Arthritis, Loose bodies. ⁽¹⁾ Shoulder injuries are common, accounting for a significant percentage of all shoulder disorders. Serious shoulder injuries result in decreased performance and result in diminished lifestyle. Failure to recognize and properly manage shoulder injuries can result in significant problem in these patients. ⁽²⁾ Arthroscopy is an invasive procedure with certain risks and discomfort for the patient and is preferably performed only for treatment purposes.

The role of magnetic resonance imaging in the diagnosis of shoulder disorders has been established. MRI is non-invasive has proved reliable and safe and offers advantages over diagnostic arthroscopy, which is currently regarded as the reference standard for the diagnosis of intra articular shoulder disorders. ⁽³⁾

Even though a large number of clinical tests are used for the diagnosis of painful shoulder they are considered accurate in determining the location of the periarticular lesions, these entities may be difficult to differentiate by physical examination.⁴

Material and methods:

A clinical diagnosis was made in patients presenting to OPD with shoulder complaints which were based on a standard shoulder examination protocol. Clinical diagnosis and MRI findings were confirmed by arthroscopy. This is a prospective study, which includes patients with various intra articular shoulder disorders symptoms. Twelve(12) patients who were received either in the emergency department or outpatient department between October 2013 and September 2015, who were clinically diagnosed to have general shoulder pathology based on a positive Dugas test and or rotator cuff pathology based on a positive external or internal lag test of shoulder, were evaluated with MRI and subsequently with diagnostic arthroscopy on the symptomatic shoulder. The study was performed with the approval of our institutional ethics committee.

INCLUSION CRITERIA:

- Age group: 20 to 70 years.
- Post-traumatic pain, instability and stiffness of the shoulder joint.
- Suspected/clinically diagnosed cases, degenerative bicipital tendinitis and rotator cuff injuries.

EXCLUSION CRITERIA:

- Infective pathologies and malignancies the shoulder.
- Previous surgery or prosthesis of shoulder.
- Age group below 20 and above 70 years.

A clinic-radiological and arthroscopic correlation of 12 patients with shoulder joint pain was undertaken to study the correlation of clinical findings with MRI and arthroscopic finding. In this study majority of the cases (5) 41.67% were in the age group between 31 and 40 years.

Results:

MRI findings in the subjects under study showed that 55.55% (10) of lesions were due to rotator cuff tear. On arthroscopy 60% (9) of lesions were rotator cuff tears.

Table 1 Validity of clinical diagnosis with arthroscopic findings in Rotator cuff tear

		ARTHROSCOPY		
		YES	NO	TOTAL
YES		7 (a)	1 (b)	8
CLINICAL	NO	2 (c)	2 (d)	4
	TOTAL	9	3	12

Sensitivity= $a / (a+c) \times 100 = 78\%$

Specificity= $d / (b +d) \times 100 = 67\%$

Positive predictive value = $a / (a+b) \times 100 = 87\%$

Negative predictive value = $d / (c+d) \times 100 = 50\%$

Accuracy = $a+d / a+b+c+d = 75\%$

Table 2 Validity of MRI findings with arthroscopic findings in Rotator cuff tear

		ARTHROSCOPY		
		YES	NO	TOTAL
YES		9 (a)	1 (b)	10
MRI	NO	0 (c)	2 (d)	2
	TOTAL	9	3	12

Sensitivity= $a / (a+c) \times 100 = 100\%$

Specificity= $d / (b +d) \times 100 = 67\%$

Positive predictive value = $a / (a+b) \times 100 = 90\%$

Negative predictive value = $d / (c+d) \times 100 = 100\%$

Accuracy = $a+d / a+b+c+d = 92\%$

Table 3vValidity of clinical diagnosis with arthroscopic findings and MRI with arthroscopic findings in Rotator cuff tear

STUDY	SENSITIVITY	SPECIFICITY	PPV	NPV	ACCURACY
CLINICAL VS ARTHROSCOPY	78%	67%	87%	50%	75%
MRI VS ARTHROSCOPY	100%	67%	90%	100%	92%

Clinical examination in Rotator cuff tears have Sensitivity of 78%, Specificity 67%, Positive predictive value 87%, Negative predictive value 50% and Accuracy of 75% compared to Arthroscopy.

MRI findings in Rotator cuff tears have Sensitivity of 100%, Specificity 67%, Positive predictive value 90%, Negative predictive value 100% and Accuracy of 92% compared to Arthroscopy.

A total of 12 patients were assessed clinically and with MRI and subjected to arthroscopy.

Discussion:

In this study clinical findings have been matched against arthroscopy and similarly MRI findings have been compared with arthroscopy, as currently arthroscopy is acknowledged as gold standard. Hence no comparison have been made for clinical findings and MRI findings. In this discussion, we have taken two clinical entities and compared each entity separately. MRI is a noninvasive examination that is highly accurate. Varying sensitivity, specificity and accuracy of MRI has been reported in literature regarding diagnosis of all rotator cuff tears. The sensitivity [100%], specificity [68%] and accuracy [92%] of rotator cuff tears in our study is comparable to that of Zlatkin et al⁽¹⁵⁾, who studied thirty one symptomatic patients on a 1.5 T MRI, and found a sensitivity of 90%, specificity of 93% for rotator cuff tears.

The sensitivity [100%], specificity [68%] for rotator cuff tears in our study is also comparable to that of Joseph et al⁽³⁾, who analysed 65 articles reporting the sensitivities and specificities of MRI for the diagnosis of rotator cuff tears found a sensitivity of 85.5%, specificity of 90.4%. Higher sensitivity in the present study is due to expertise involved in study, MRI being done and reported by trained radiologists in musculoskeletal imaging. The lower specificity of our study was due to small sample size.

Utkarsha et al⁽⁴²⁾ carried out prospective study of 30 patients of shoulder instability including both sexes and all age groups. The patients were first examined clinically, followed by MRI scan and finally arthroscopically. The findings of diagnostic arthroscopy were correlated with clinical & MRI findings. Sensitivity, Specificity

and diagnostic accuracy of clinical examination for anterior instability was 85%, 100%, 86% respectively. This is comparable to the sensitivity of 80%, sensitivity of 71% and accuracy of 75% in the present study.

clinical examination and found to have anterior labral tear on arthroscopy. One of them showed an associated Hill-Sachs lesion.^{5,6,7}

Three patients were showing positive clunk test and were suspected to be having a Superior Labrum Anterior Posterior tear. Two of them were found to be true positive on arthroscopy. One patient was given a false positive diagnosis of SLAP which was given normal on arthroscopy.

Conclusion:

Diagnostic Arthroscopy is the gold standard and clinical & radiological examinations are compared with arthroscopy. The sensitivity and specificity for all pathologies is higher for arthroscopy in our study as compared to clinical and MRI examinations, as is the observation of most workers in this field.

References:

- 1) Joseph castillo. MRI clinical applications II. MRI of the shoulder. *La Radiologia Medica*, 93:143-144.
- 2) Feller JF, Tirman PFJ, Steinbach LS, Zucconi F. MRI of sports injuries of shoulder. 1995; 30:224-40.
- 3) Joseph O. de Jesus, Laurence Parker, Andrea J. Frangos, Levon N. Nazarian. Accuracy of MRI, MR Arthrography, and Ultrasound in the Diagnosis of Rotator Cuff Tears: A Meta-Analysis. *AJR* 2009; 192.
- 4) Naredo E, Aguado P, De Miguel E, Uson J et al. Painful shoulder: comparison of physical examination and ultrasonographic findings. *Ann Rheum Dis* 2002; 61:132-36.
- 5) Smith JG. Pathological appearances of seven cases of injury of the shoulder joint with remarks. *London Med Gazette* 1834; 14: 280-85.
- 6) Codman EA. Complete rupture of the supraspinatus tendon: operative treatment with report of two successful cases. *Boston Med Surg J* 1911; 164:708-10.
- 7) Moseley HF. The arterial pattern of the rotator cuff of the shoulder. *J Bone Joint Surg* 1963; 45B: 780-89.

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