International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2018; 4(1): 395-397

www.orthopaper.com
Received: 08-11-2017
Accepted: 09-12-2017

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Clinical examination versus Magnetic resonance imaging in diagnosing Rotator cuff injuries

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DOI: https://doi.org/10.22271/ortho.2018.v4.i1f.58

Abstract
Objective: The aim of this study is to assess the sensitivity and specificity of clinical examination to MRI in rotator cuff injuries.
Materials and Method: Prospective study done during the period July 2015 to Jan 2017. The inclusion criteria were patients between age group 20-70 years who reported to outpatient department or casuality with shoulder pathology. The patients should have suspected/ clinically diagnosed to have Shoulder pathologies like instability, stiffness of shoulder, bicipital tendinitis and rotator cuff injuries. The exclusion criteria were infective pathologies and malignancies of the shoulder, previous surgery or prosthesis of shoulder and associated fresh fracture. All the patients underwent rigorous clinical evaluation and MRI of the affected shoulder.
Results: In our study majority of the case (10 patients) 41.6% were in the age group between 31 to 40 years. 75% of the patients participated in the study were males. The sensitivity and specificity of clinical examination to MRI were 83.3% and 100% respectively.
Conclusion: Clinical examination can alone be used for diagnosis of suspected Rotator Cuff tears. It is very useful in rural settings where MRI is not available.

Keywords: Rotator cuff, MRI, Shoulder pain, Jobes test, Supraspinatus

Introduction
Spectrum of etiologies that can give rise to shoulder pain are acute trauma to a gamut of degenerative disorders and impingement syndrome [1]. 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 and 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. In recent years MRI replaced other techniques for evaluating Shoulder disorders by its non-invasiveness and highly accurate early evaluation of soft tissue pathology. MRI 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 [2]. 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. The aim of this study is to assess the sensitivity and specificity of clinical examination to MRI in rotator cuff injuries.

Materials and Method
Prospective study done during the period July 2015 to Jan 2017. The inclusion criteria were patients between age group 20-70 years who reported to outpatient department or casuality with shoulder pathology. The patients should have suspected/ clinically diagnosed to have Shoulder pathologies like instability, stiffness of shoulder, bicipital tendinitis and rotator cuff injuries. The exclusion criteria were infective pathologies and malignancies of the shoulder, previous surgery or prosthesis of shoulder and associated fresh fracture. The patients once reached the OPD or casuality were clinically evaluated by a detailed history and necessary clinical tests and arrived at a diagnosis.

All the patients underwent rigorous clinical evaluation and test like neers impingement test, jobes isolation test, empty can test, Infraspinatus isolation test, patte test, Gerbers lift off test, speed test, yergasons test etc.

Mri was done using 1.5 tesla machine. [Symphony maestro class, Siemens, Erlanger, Germany]. Transmit-receive extremity coil was applied as close as possible to the symptomatic shoulder joint. The patient was placed in the supine position with the shoulder and arm placed along the side and parallel to the body, positioned in neutral to mild external rotation. A small [160-180 mm] field of view, matrix of 512 X 512 was used. A slice thickness of 4mm & inter slice distance is 0.4mm was used. Axial acquisition through the glenohumeral joint was used as initial localizer for subsequent sagittal and coronal planes images. The following sequences were used: T2 medic axial/Coronal, PD FS axial/Sagittal and STIR Sagittal. The approximate total imaging time for the study was 30 min. All MR studies were prospectively interpreted using established criteria for diagnosing shoulder disorders. [3-7] For each shoulder, we correlated the clinical and radiologic findings for following structures [all four rotator cuff tendons and biceps tendon, glenoid labrum, sub acromial space]. Record of clinical and MRI findings were compared.

Results

Clinical and radiological correlation of 28 patients with shoulder joint pain was undertaken. In our study majority of the case (10 patients) 41.6% were in the age group between 31 to 40 years. 75% of the patients participated in the study were males. Table 1 and table 2 clearly project the diagnosis and the number and percentage of cases for various shoulder pathologies like rotator cuff, SLAP lesion, Bankart lesion etc.

Table 1: Clinical diagnosis

Pathology	No of cases	Percentage
Rotator cuff tear	16	57.14
SLAP lesion	4	14.2
Bankart Lesion	6	21.4
Hill sachs lesion	2	7.1

Table 2: MRI diagnosis

Pathology	No of cases	Percentage
Rotator cuff tear	20	71.4
SLAP lesion	2	7.14
Bankart Lesion	4	14.28
Hill sachs lesion	2	7.14

Table 3: Validity of clinical diagnosis with MRI diagnosis in Rotator cuff tears

	Mri Diagnosis		
Clinical Diagnosis		Yes	No
	Yes	20(a)	0(b)
	No	4 (c)	8(d)

Sensitivity= a / (a+c) x 100 = 20/24 x100=83.3%
Specificity= d/ (b +d) x 100 = 8/8 x100=100%
Accuracy = a+d/ a+b+c+d = 28/32 x 100=87.5%

Discussion

Rotator cuff tear is one of the most common diagnosis and a leading cause for shoulder disability. The common presentation of Rotator cuff tears were shoulder pain, weakness, and loss of range of motion. These symptoms are not unique to rotator cuff tears and the differential diagnosis includes labral tears, glenohumeral ligament tears or sprains, adhesive capsulitis, proximal peripheral neuropathies, and cervical radiculopathy. Increasing age and traumatic shoulder injury also increase clinical suspicion of rotator cuff tear [8]. A careful history and structured physical examination can often establish the diagnosis of rotator cuff tear [9].

A total of 28 patients were assessed clinically and with MRI. In this study, we had taken only rotator cuff tear and compared clinical entity with MRI. Now a days Clinical examination is considered as initial assessment in diagnosing rotator cuff tears. But contrary to the belief that MRI is mandatory for diagnosis of rotator cuff, proper and structured clinical examination will fetch the diagnosis. We have performed clinical examination on twenty eight patients. From table 3 the clinical tests have shown a sensitivity of 83.3% and specificity of 100%. The sensitivity [83.3%], specificity [100]% and accuracy of [87.5]% for rotator cuff tears in present study is comparable to that of AM Malhi *et al* [10], who studied one thirty symptomatic patients, performed tests and found a sensitivity of [100%], specificity of [99%] for rotator cuff tears. The main difference between our study and Malhi *et al* study was that we compared clinical diagnosis with MRI while Malhi *et al* compared clinical diagnosis with arthroscopy. Orthopaedic clinical examination is a skill that is taught at undergraduate level and refined during postgraduate training. It will therefore be important that not only trainee orthopaedic surgeon but to the General practioner to learn that skill as shoulder pain is one of the most common complaint.

Conclusion

This study reinforces the importance of a good clinical examination of the shoulder in making a most probable diagnosis particularly for rotator cuff. Clinical examination can alone be used for diagnosis of suspected Rotator Cuff tears. It is very useful in rural settings where MRI is not available. Even though diagnostic arthroscopy is considered as a gold standard proper and structured shoulder examination will almost fetch the diagnosis.

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