Original Research Paper Radiology

Efficacy of MRI over Conventional Radiograph in detecting labroligamentous lesions in cases of anterior instability of Glenohumeral Joint

Dr.Shishir Kumar	Senior Resident, DEPARTMENT OF RADIODIAGNOSIS, MGM MEDICAL COLLEGE & HOSPITAL, KAMOTHE, NAVI MUMBAI - 410 209.
Dr.Shreyansh.S. Kothari	Resident, DEPARTMENT OF RADIODIAGNOSIS, MGM MEDICAL COLLEGE & HOSPITAL, KAMOTHE, NAVI MUMBAI - 410 209.
Dr.Priti Kapoor	Professor, DEPARTMENT OF RADIODIAGNOSIS, MGM MEDICAL COLLEGE & HOSPITAL, KAMOTHE, NAVI MUMBAI - 410 209.

ABSTRACT

MR imaging is modality of choice for visualization of both soft tissue and osseous pathology of the Glenohumeral joint, which is not possible with conventional radiograph, arthrogram and ultrasonography.1,2 Though conventional radiography is the first imaging modality for virtually all shoulder pathology . Radiographs are often the only imaging study necessary for the evaluation of acute shoulder trauma, calcific tendonitis, arthritis, and osteolysis of distal clavicle (in athletes).3

In our study we have studied 30 patients with complaints of anterior instability of glenohumeral joint and were clinically suspected of labro-ligamentous lesion whose conventional radiograph were normal. In most of cases MRI detected multiple labral and ligamentous abnormalities inspite of radiograph being normal.

KEYWORDS Glenohumeral Joint, Anterior Instability, S Kumar, S Kothari, P Kapoor.

Introduction :

Glenohumeral joint(aka Shoulder Joint) is the most mobile and most unstable joint of the body.[4] The humeral head articulates with relatively shallow glenoid fossa of the scapula and is dependent on muscular ligaments and labral integrity for instability.[5] Anterior instability is more common and its etiology varies from being labor-ligamentous lesion, rotator cuff tears and osseous lesions. Mostly there is injury of anterior labrum and anterior band of inferior glenohumeral ligament. (Bankart lesion, Hill Sach's lesion etc.)[6]

Injuries associated with anterior ligament and capsule dislocations include : Avulsion of the anterior inferior glenohumeral ligament (AIGHL) and capsule from the glenoid (more common in younger individuals), HAGL lesion with or without bone flecks, Fractures of the glenoid, humeral head, tuberosities, or coracoid process, Cuff tears associated with anterior and inferior glenohumeral dislocation (30% incidence in patients less than 40 years of age and 80% incidence in patients over 60 years of age), Vascular injury, which may occur during dislocation or reduction and is more common in elderly patients. The structures at risk include the axillary artery or vein or branches of the axillary artery—the thoracoacromial, subscapular, circumflex, and less commonly the long thoracic.

Neurovascular injuries, usually affecting the brachial plexus and axillary nerves.[7]

Aim and Objective :

- To compare efficacy of conventional radiograph and MRI in detecting labro-ligamentous lesion in case of anterior instability of Glenohumeral joint.
- To assess different etiologies of anterior instability of Glenohumeral joint using MRI as imaging modality.

Material and Methods :

Source of Data : 50 patients clinically presenting as case of anterior instability of Glenohumeral joint who were suspected of labro-ligamentous lesions were evaluated irrespective of their age and sex. Conventional radiograph and MRI shoulder joint were performed on these patients.

Inclusion Criteria :

All pateints with normal radiograph and presence of labro-ligamentous lesion on MRI.

Exclusion Criteria :

Patients with abnormal radiograph as in acute shoulder trauma, calcific tendonitis, arthritis, and osteolysis of distal clavicle.

Patients with any operative history or with any congenital abnormality.

Data Collection ;

After all exclusions data of 30 patients were included in our study which fulfilled our inclusion criteria. A prospective cross sectional study was done. Study was conducted for a period of 1 year.

Results :

It was a prospective and observational type of cross sectional study which included 30 patients.

The study infers that MRI is more accurate in detecting the labro-ligamentous lesions in patients with instability of Glenohumeral joint who have normal shoulder radiograph and moreover MRI also helps in assessing the etiology of anterior instability which helps in pre procedure evaluation.

Discussion :

The primary observation in this study states that MRI is modality of choice in detecting labro-ligamentous lesion in instability of Glenohumeral joint[8] while conventional radiograph has limited use in detecting such lesions and is diagnostic in osseous lesions only[9].

MRI findings of anterior instability may reveal a large number of labroligamentous abnormalities along with osseous lesions.

Bankart Lesion – is named after **Arthur Sydney Blundell Bankart,** British orthopedic surgeon and is most common labral injury which occurs due to tear of anterior inferior labrum with associated periosteal tear.10-12 It could be purely cartilaginous or can involve the bony rim of glenoid(Bony Bankart).

Hill Sachs Lesion – described by **H A Hill & M D Sachs** in 1940 and is a common injury associated with anterior glenohumeral

instability. It comprises of osseous injury to postero-superior humeral head which can present as subtle marrow oedema in milder cases to impaction fracture and bony fragment loss in severe cases.[13]

Perthes Lesion – is named after **Georg Clemens Perthes** (1869-1927) German surgeon, who first described the lesion in 1905 and is defined as tear of glenoid labrum with intact scapular periosteum.[14] Difficult to detect on conventional MRI, MR arthrogram improves detection rate.

ALPSA Lesion – was described by **Neviaser,** is defined as an avulsion and medial rolling of inferior labroligamentous complex along the scapular neck usually secondary to chronic injury.[15]

GLAD Lesion – was also described by **Neviaser** comprises of a superficial anterior inferior labral tear associated with articular cartilage injury.[16]

SLAP Lesion – Superior labrum anterior and posterior lesion described by **Snyder et al,** is an injury involving the superior aspect of glenoid labrum with biceps tendon anchor. Oftenly associated with anterior shoulder dislocation.[17]

HAGL Lesion – Humeral avulsion of anterior glenohumeral ligament is less commonly encountered and causes anteroinferior instability.[18]

GAGL Lesion – uncommon lesion implies to an avulsion of the inferior glenohumeral ligament from inferior glenoid without disruption of labrum.

Rotator Cuff Tears – These tears are associated with anterior and inferior glenohumeral dislocation and is common in elderly.

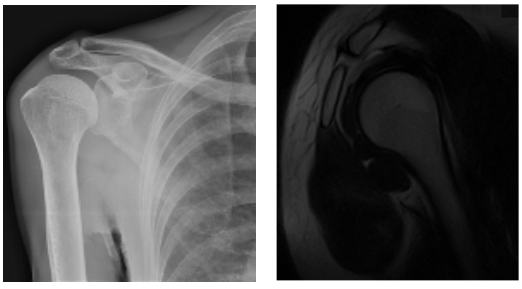

Figure 1 & 2 : 25 years male patient with c/o anterior instability of shoulder joint. Shouler radiograph reveal no significant abonormalities . Sagittal PD MRI images however reveal partial tear of supraspinatus tendon.

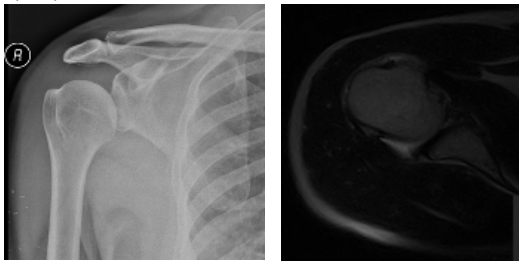

Figure 3 & 4 : 30 years male patient with c/o anterior instability of shoulder joint. Shouler radiograph reveal no significant abonormalities . Axial PD MRI images however reveal Bankart and Hill Sach's lesion.

Refrences :

1. Zlatkin MB, Iannotti JP, Roberts MC, et al. Rotator cuff tears: diagnostic performance of MR imaging. Radiology 1989;172(1):223.
2. Burk DL, Jr., Karasick D, Kurtz AB, et al. Rotator cuff tears: prospective comparison of MR imaging with arthrography, sonography, and surgery. AJR Am J Roentgenol 1989;153(1):87.
3. Willick SE, Sanders RK. Radiologic evaluation of the shoulder girdle. Phys Med Rehabil Clin N Am 2004; 15:373.
4. Tirman PFJ. Glenohumeral instability. In: Steinbach LS, Tirman PFJ, Peterfy CG, Feller JF, editors. Shoulder magnetic resonance imaging. Philadelphia: Lippincott-Raven; 1998. pp. 135–167.
5. Stoller DW, Wolfe EM, Li AE, Nottage WM, Tirman PFJ. The shoulder. In: Stoller DW, editor. Magnetic resonance imaging in orthopedics and sports medicine. 3rd ed. Philadelphia, PA: Lippincott Williams and Wilkins; 2007. pp. 1194.
6. Manisha Jana, S Gamanagatti. Magnetic resonance imaging in glenohumeral instability; World Journal of Radiology Volume 3 Issue 9 2011 pp 224.
7. Matsen III F, Titelman R, Lippitt S, et al. Glenohumeral instability, Chapter 14. In: Rockwood C, Matsen III F, Wirth M, Lippitt S, eds. The shoulder, 3rd ed. Philadelphia: Saunders, 2004:655.
8. Ng AW, Chu CM, Lo WN, Lai YM, Kam CK. Assessment of capsular laxity in patients with recurrent anterior shoulder dislocation using MRI. AJR Am J Roentgenol. 2009 Jun. 192(6):1690-5.
9. Saliken DJ, Bornes TD, Bouliane MJ, Sheps DM, Beaupre LA. Imaging methods for quantifying glenoid and Hill-Sachs bone loss in traumatic instability of the shoulder: a scoping review. BMC Musculoskelet Disord. 2015 Jul 18. 16:164.
10. Waldt S, Burkart A, Imhoff AB, Bruegel M, Rummeny EJ, Woertler K. Anterior shoulder instability: accuracy of MR arthrography in the classification of anteroinferior labroligamentous injuries. Radiology. 2005;237:578–583.
11. Rowan KR, Keogh C, Andrews G, Cheong Y, Forster BB. Essentials of shoulder MR arthrography: a practical guide for the general radiologist. Clin Radiol. 2004;59:327–334
12. Shankman S, Bencardino J, Beltran J. Glenohumeral instability: evaluation using MR arthrography of the shoulder. Skeletal Radiol. 1999;28:365–382.
13. Workman TL, Burkhard TK, Resnick D et-al. Hill-Sachs lesion: comparison of detection with MR imaging, radiography, and arthroscopy. Radiology. 1992;185 (3): 847-52.
14. Wischer TK, Bredella MA, Genant HK, Stoller DW, Bost FW, Tirman PF. Perthes lesion (a variant of the Bankart lesion): MR imaging and MR arthrographic findings with surgical correlation. AJR Am J Roentgenol. 2002;178:233–237.
15. Neviaser TJ. The anterior labroligamentous periosteal sleeve avulsion lesion: a cause of anterior instability of the shoulder. Arthroscopy. 1993;9:17–21.
16. Neviaser TJ. The GLAD lesion: another cause of anterior shoulder pain. Arthroscopy. 1993;9:22–23.
17. Snyder SJ, Karzel RP, Del Pizzo W, Ferkel RD, Friedman MJ. SLAP lesions of the shoulder. Arthroscopy. 1990;6:274–279.
18. Wolf EM, Cheng JC, Dickson K. Humeral avulsion of glenohumeral ligaments as a cause of anterior shoulder instability. Arthroscopy. 1995;11:600–607.