Original article:

Ultrasonographic Evaluation of Painful Shoulder joint in rural population

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Abstract:

Introduction: In rural area many people suffer from shoulder joint pain. However they usually neglect it and present late only when there is problems in their daily activities. The present observational study was undertaken to describe the sonographic appearances of various pathologies of shoulder presenting with pain and how best ultrasonography can provide solution with minimum expenditure to the patient as well as to arrive at correct diagnosis.

Materials and methods: A prospective study was done on patients presenting with H/O pain in shoulder joint. A total of 75 cases were studied over 2 year. Sonographic imaging of the shoulder was done on Siemens G 60S and Mindray DC7 ultrasound equipment. A total of 75 patients with pain in shoulder joint were subjected to sonography out of which 50 cases had positive USG findings.

Observations and Results: Full/ Partial thickness tears (25%) were the commonest observed pathology followed by Biceps tendinitis (16%) & Supraspinatus tendinitis (6%). Subacromiodeltoid bursitis noted in 4 cases (5%), AC joint arthropathy noted in 4 cases (5%)

Conclusion: Ultrasound provides valuable diagnostic information with a high degree of diagnostic accuracy.

Keywords: ultrasonography, shoulder joint

Introduction:

Imaging of the shoulder is a common investigation requested in patients presenting with shoulder pain and functional disabilities. A wide variety of etiologies, from rotator cuff pathologies to calcifying tendinosis, synovitis, acromioclavicular arthritis, and cervical radiculopathy may lead to similar symptoms. Shoulder arthrography and magnetic resonance imaging have been the imaging modalities commonly used to distinguish among these conditions.\(^1,2\)

The development of musculoskeletal ultrasonography, based on advanced ultrasound (US) capabilities, has enabled this technique to be included as a primary imaging investigation among the battery of available diagnostic tests.\(^3\) Knowledge of optimal techniques, normal anatomy, dynamic maneuvers, and pathological conditions is essential for correct US imaging and interpretation.\(^4\) Comparison between the damaged and the contralateral sides may aid in reaching diagnostic conclusions. The present work was planned to analyze ultrasonographic appearances of various pathologies of the shoulder joint and to see the extent of the tear and its localization and involvement of the adjacent soft tissue.

Materials and methods:

The present work was completed at Pravara Institute of Medical Sciences, Loni, Maharashtra, India at Department of Radio diagnosis. The Institutional ethical committee clearance was obtained. This work was done for two years duration. The data was collected by simple random sampling technique from patients attending routine OPD in our hospital. The written consent was obtained. The patients with history of painful
shoulder joint referred to radiology department were included in present study. The patients not willing in participation of study were excluded. The sample size was calculated and determined by previous similar work done.

High resolution ultrasonography was performed in 75 patients with history painful shoulder joint (48 men, 27 women; years). Musculoskeletal ultrasonography; using SONOLINE G-60 S. These imaging studies were obtained to evaluate rotator cuff, bursa, joint space and AC joint pathologies causing painful shoulder joint.

**Results:**

Among 75 patients, clinically diagnosed to have painful shoulder that underwent sonography were 48(64%) males and 27(36%) females. Majority of the subjects, 47 (62%) patients (47 males and 30 females) were in the age group of 40 – 60 yrs or above. The male preponderance among the subjects is very clear in the study. The male and female do not differ with regard to the higher incidence of right shoulder involvement than the left shoulder. The prevalence of diabetes is more in the age group of 40-60 years. All these factors resulted in greater incidence of rotator cuff and non rotator cuff disorder in the age group of 40 to 60yrs.

*High resolution ultrasonography (HRUSG)* showed supraspinatus tendon was most commonly involved in 18 (36%) of painful shoulders and least commonly involved tendon was Infraspinatus with no case (0%). The incidence of bicipital tendon pathologies was 36 % among patients of painful shoulder. HRUSG was useful in diagnosing full thickness and partial thickness tear in 18 patients. In total 6 cases of Subacromial-subdeltoide bursitis, of which 4(66%) cases showed isolated subacromial subdeltoid bursal fluid collection without any obvious underlying rotator cuff tear, where as 2(33.3%) cases of bursal fluid collection with rotator cuff pathologies were noted. Hill sach’s lesion positive in 3 patients with h/o recurrent anterior shoulder dislocation. 2 patients with h/o fever and swelling over shoulder showed sonographic features of septic arthritis.

**Discussion:**

As per Nitin G Chaubal, 60% of shoulder abnormalities have been attributed to rotator cuff disease, which is the most common cause of shoulder pain and dysfunction in patients above 40yrs of age. Degenerative rotator cuff is seen in - 70% of individuals above the age of 65yrs have a rotator cuff tear. In our study group, Out of 47 patients who were 40 years and above in age, 29 patients (61.7 %) had isolated or combined pathologies of the rotator cuff. According to Pradeep Goyal et al, Ultrasound showed supraspinatus lesions in 21 (52.50%) of painful shoulders and least commonly involved tendon was Infraspinatus (5%). This correlated well with our study data in which supraspinatus lesions were seen in 19 (38%) of painful shoulders and least commonly involved tendon was Infraspinatus with no case (0%).

In the group of symptomatic shoulders, who were diagnosed as rotator cuff pathology, in them 25 patients showed sonographically normal study, which should not be interpreted as false negative cases because this study did not use a gold standard. Diabetes mellitus also plays a role in rotator cuff pathologies. Out of study sample, 19 (~25%) patients were diabetic, 15(83%) patients who were diabetic showed rotator cuff pathologies against 04 patients who had diabetes but showed no evidence of rotator cuff pathology. Our findings were supported by a large study including 300 patients to ascertain etiological variables in the development of rotator cuff disease which also concluded that Diabetes Mellitus had a strong correlation with development of rotator cuff pathologies.
In our study there were 2 complete full thickness supraspinatus tear which were isolated or in combination with other abnormalities. This finding is present when there has been a complete rupture of the rotator cuff. This type of criteria regarding the full thickness tear is supported by Nitin G chaubal \(^7\), and MG Soble. \(^8\) In our study we came across 12 partial thickness tear involving either supraspinatus (66.7%) or subscapularis (33.3%), showing radiolucent area within the substance of the tendon. These findings were correlated with Marnix T. van holsbeeck et al \(^9\).

There were total 8 cases, of which 3 (37.5%) cases showed isolated subacromial subdeltoid bursal fluid collection without any obvious underlying rotator cuff tear, where as 5 (62.5%) cases of bursal fluid collection with rotator cuff pathologies were noted. According to marnix van holsbeeck et al \(^9\), Subacromial subdeltoid bursa is irritated by chronic repetitive trauma and further leading to impingement syndrome. The integrity of the underlying rotator cuff determines the grade of impingement ranging from an intact rotator cuff with bursal hemorrhage, fibrosis, and tendon edema (grade 1 and 2) to a torn rotator cuff (grade 3). A.T. Kharat et al \(^10\), stated that Acute tendinitis is detected by increased fluid within the synovial sheath. This increased fluid is seen as an anechoic halo around the tendon on transverse scan. Chronic tendinitis is seen as thickening of the tendon itself without increase in the synovial fluid. Comparison with opposite side is essential to make a diagnosis of chronic tendinitis. Tenosynovitis is inflammation of tendon sheaths. It can be caused by trauma, pyogenic infection or rheumatoid arthritis. In this study, among the bicipital tendon pathologies there were isolated 12 cases of peritendinous fluid accumulation without tendon abnormality, 5 cases of chronic tendinitis and in 2 cases subacromial-subdeltoid bursitis.

Athanasiou Papatheodorou \(^11\) stated that USG is helpful in evaluating the superior aspect of the acromioclavicular joint. By using a sagittal plane and the gap between clavicle and acromion as a window, it is possible to image the joint space. Joint fluid is a rare finding in normal shoulders. Bone erosion, fluid, cysts, and hypertrophic changes represent degenerative changes. In this study, patients having acromioclavicular joint degenerative pathology were all above 50yrs. 2 cases had positive finding for acromio-clavicular joint arthritis. Athanasios Papatheodorou \(^12\) stated that Calcific tendinopathy is a common disorder caused by deposition of calcium hydroxyapatite crystals in various shoulder tendons. The cause is considered to be dystrophic, and all tendons can be affected, although the most common site is within the supraspinatus tendon near its insertion. In this study, 1 case was observed involving supraspinatus tendon, which was seen at the insertion site due to old tear or due to chronic degenerative changes.

The Hill-Sachs lesion is a depressed intra-articular compression fracture located on the posterolateral aspect of the humeral head typically observed after episodes of anterior glenohumeral dislocations. It can be regarded as a hallmark of anterior glenohumeral joint dislocation because it occurs in up to 47% of patients after the first episode of dislocation and up to 100% in patients with recurrent disease. In this study, 3 cases were recorded in which a wedge-shaped shallow defect of the hyperechoic bony contour of the humeral head at the point where the anterior portion of the infraspinatus inserts into the greater tuberosity. Synovial proliferation is one of the early manifestations of rheumatoid arthritis and its detection has practical importance because it can indicate early aggressive treatment to try to limit extensive erosive changes, tears of para-articular ligaments and tendons as well as functional
disabilities. In this study, patient had a h/o pain and swelling over right shoulder. 1 case had a positive for finding for synovial proliferation. Both the deep surface and the subacromial- subdeltoid bursal contour become concave rather than showing the usual convex appearance. The concavity should be deep i.e. greater than 50% of the tendon thickness in order to differentiate full thickness, bursal surface disruption. In this study, there is 1 case of deltoid muscle herniation is recorded, presented with c/o unbearable shoulder pain at night. HRUSG features were breech in the continuity of the bursal surface of supraspinatus tendon with concave contour.

Degenerative arthropathies of the gleno-humeral joint may be idiopathic or secondary to a longstanding massive tear of the rotator cuff. HRUSG findings include narrowing of joint space, osteophytes and intra-articular loose bodies. Intra-articular loose bodies are the end result of progressive disintegration of the articular cartilage and subchondral bone which leads to release of fragments within the joint cavity. In our study, 1 case of degenerative arthropathy is noted, showing hyperechoic intra-articular loose bodies with posterior acoustic shadowing- ‘Rice bodies’.

Conclusion:
High-resolution ultrasound has been shown to be an efficient imaging modality for the assessment of a wide spectrum of rotator cuff and non-rotator cuff disorders. High resolution of shoulder can be used as a primary imaging modality for evaluating the rotator cuff. It is fast and inexpensive and allows dynamic assessment of the joint. Non rotator cuff disorders like tenosynovitis, tendinopathies, joint effusion, bursal collections, calcific tendonitis, chronic arthritic changes, can be easily demonstrated. Simultaneous, scanning the patients shoulder in two orthogonal planes both in static and dynamic position helps us to cone down the exact site of pathology, the tendon involved and also to rule out many artifacts.

References:


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