



Acromioclavicular Joint Pathologies; Incidence and Clinical Importance, Our Experience in Jordan

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Introduction

The other joint of the shoulder girdle, the acromioclavicular joint, small joint, yet might be affected by variable pathologies and be the cause of significant symptomatology and interference with daily life activities of the affected personnel.

Imaging plays an important role in diagnosis and evaluation of AC joint diseases. Both radiologists and physicians should be familiar with the spectrum of pathologies affecting the AC joint and should be able to ask for the proper imaging modality.

This is a single center retrospective study done at king Hussein medical center in Amman Jordan, in this study we will try to highlight the prevalence of different pathologies affecting the AC joint in Jordanian population.

Methods

After ethical committee approval, Revision of 480 shoulder MRI studies done between January 2016 and January 2017 for patients aged 28 to 72 years with variable clinical presentation to orthopedic or rheumatology clinic.

All studies were done on 3 tesla MRI machines, Philips Ingenia or Siemens Skyra machine with routine shoulder protocol and dedicated shoulder coil.

All studies were reviewed by senior radiologists and results were analyzed using simple statistical methods.

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Results

The presenting symptoms were variable and were presented in the following Table 1.

All studies were reviewed for AC joint pathologies only and other findings in shoulder MRI were not emphasized, the findings we were looking for include bone marrow edema, synovial hypertrophy.

Erosions, callus formation and sclerosis, subarticular cysts, acromion shape, widening of AC joint space, subacromial bursitis, synovial cysts or collections, ligamentous or muscle injury, most patients have more than one imaging finding, the findings were as following Table 2.

The shape of acromion were assessed and the results were as shown in the following chart (Chart 1).

Discussion

The AC joint is the joint between the lateral end of the clavicle and the medial acromion [1-3], it is synovial joint with vertically oriented articular disc [4]. It has both static and dynamic stabilizers [4,5,6].

Ligaments provide static stability, the acromioclavicular ligaments prevent anterior and posterior AC joint dislocations while the coracoclavicular ligament prevent superior displacement [6,7], the coracoacromial ligament prevent the humerus from superior subluxation.

The dynamic stabilizers of the AC joint are all the muscular attachments [6,7].

Imaging of the AC joint start with simple X-Rays which is in spite of all advances in shoulder imaging still play an important role in assessment of traumatic AC joint dislocations, in grading of

Table 1: The presenting symptoms were variable.

Chief complaint	Number	Percentage
Chronic pain/Discomfort	182	38%
Limitation of movement	110	23%
Acute pain	68	14%
Trauma	53	11%
Combination	67	14%

Table 2: Patients have more than one imaging finding.

Finding	Number	Percentage
Bone marrow edema	260	54%
Synovial hypertrophy	204	42.50%
Erosions	42	8.70%
Joint effusion	150	31.20%
Synovial cysts or collection	60	12.50%
Subacromial bursitis	248	51%
Callus/Sclerosis	180	37.50%
Ligamentous or ligament injury	24	5%
Subarticular cysts	142	29.50%
Os Acromiale	39	8%



Figure 1: Hooked acromion process.

edematous changes [1-6].

Bone marrow edema might be the only and early positive MRI finding and help in diagnosing traumatic AC injuries, arthropathies and inflammation [1-3,5] and this finding can only be confidently depicted on MRI imaging.

MRI is superior modality because of its multiplanar nature so you can evaluate the AC joint in any plane and subtle changes can be detected.

Combination of MRI findings is seen in high percentage in same patient. In the other hand combination of imaging modalities might be needed for better evaluation.

The shape of acromion is important imaging finding because it might be the cause of patient's symptoms, as we can see in Figure 1 type III or hooked acromion with impingement on the musculotendinous junction of the supraspinatus tendon the shape of the acromion was assessed in this study and results were as in the pie chart in the results section where type I and II were around 90% of cases while type III was seen in 7 percent of cases and type IV only seen in minority.

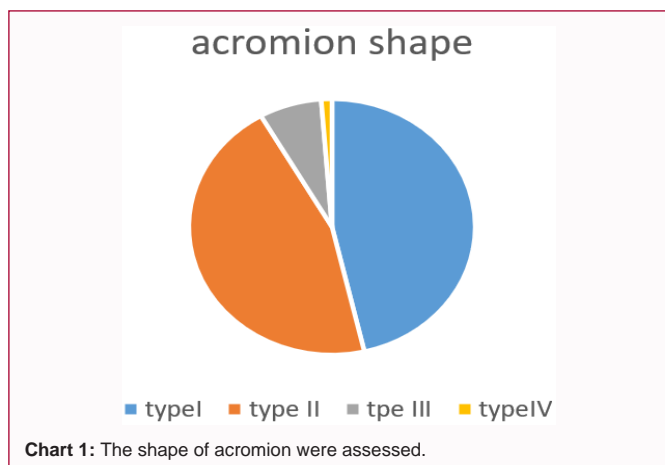
Another important imaging finding was the presence of Os acromiale which in this study was seen in around 8% of the study sample. Os acromiale is an accessory bone seen at the acromion process due to unfused ossification center. It is best assessed in superior images of axial MRI of the shoulder as seen in Figure 2. It might be a cause of rotator cuff impingement and resultant tear.

Degenerative changes with synovial hypertrophy and callus formation are the most common abnormality encountered in imaging of AC joint as shown in next Figure 3.

A common imaging finding is the presence of subacromial bursitis often with extension to subdeltoid space as shown in next Figure 4.

Sometimes the fluid extends upwards to the subcutaneous tissues to present as palpable mass overlying the AC joint which is known as geyser sign as shown in the next Figure 5.

MRI is important in assessing muscle and ligamentous injury which may be seen as only alteration in MRI signal characteristics and may not be evident in other imaging modalities as seen in the next image where we can see edema and injury to the coracoclavicular ligament with bony edema of the AC joint and this is important finding in cases of AC joint dislocation as it will upgrade the AC joint dislocation to grade III and this will affect the management. An



osteoarthritis and is mandatory in evaluation of bony lesions affecting the acromion process or the clavicle [8].

Many spaces should be evaluated when evaluating AC joint on plain film, the AC and coracoclavicular distances [8]. The acromioclavicular space should be evaluated as narrowing of this space might be indicative of full thickness rotator cuff tear with retraction and muscle atrophy [7-9].

Plain film has limited value in evaluation of bony edema, subtle erosions, occult fractures and ligament and muscle injuries [8-11] which account for a significant positive finding in our study.

Another simple non-invasive widely available imaging modality is US and this particularly important in US guided interventions such as joint aspirations and analgesia either direct to the AC joint or the adjacent spaces [10].

MRI is now widely accepted as the modality of choice for assessment of the AC joint. It's particularly superior is assessment of articular cartilage, capsule, ligaments integrity, muscles and bony

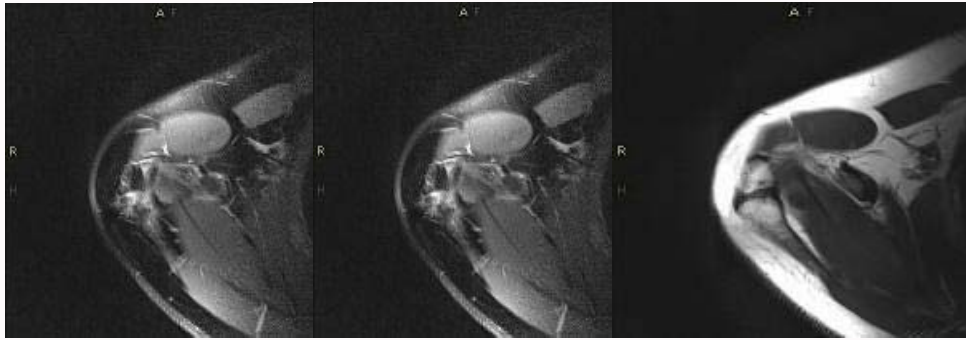


Figure 2: Axial PD and PD Fat sat MRI showing triangular bone seen related to AC joint (os acromiale).

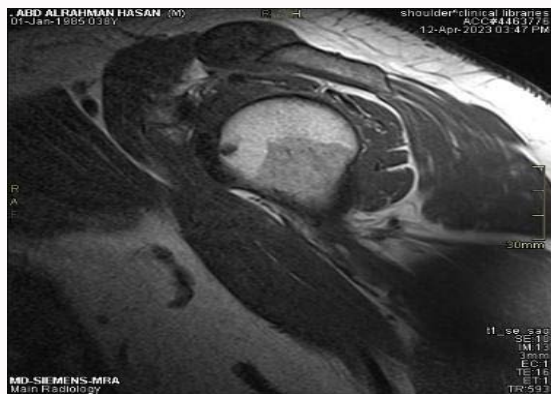


Figure 3: Sag obl T1 showing degenerative hypertrophy and callus formation.

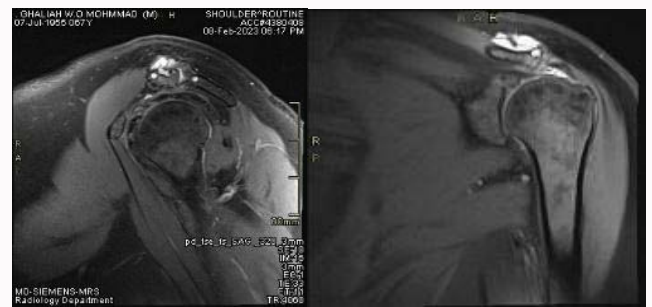


Figure 5: Coronal and sag obl images showing geysers sign.

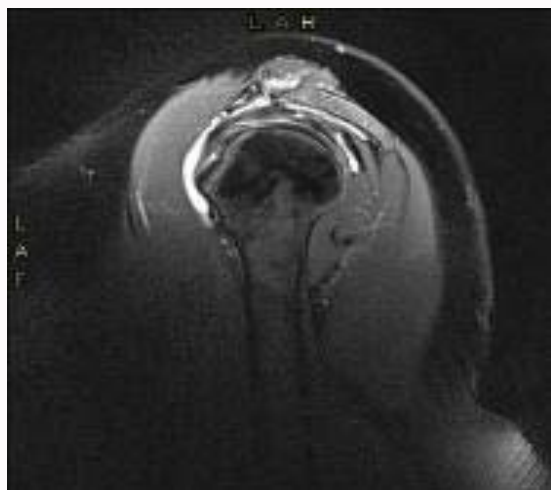


Figure 4: Sag obl pd fat sat showing subacromial subdeltoid bursitis.



Figure 6: Edema of coracoclavicular ligament.

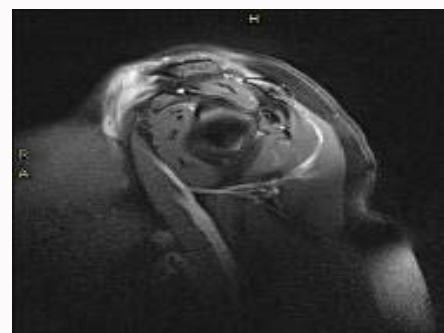


Figure 7: muscle edema as seen in PD fat sat images.

example shown in Figure 6.

And below Figure 7 is another example of muscle injury depicted on MRI and may be difficult to assess in other imaging modalities.

We should not forget that AC joint is synovial joint and might be affected by synovial based pathologies and affected by all types of arthritis and the bony structures might be involved in any type of bone pathologies.

Next is a case of involvement of Acromion and clavicle by enchondromas in patient of Ollier disease as shown in Figure 8.

Conclusion

AC joint is important joint affected by different pathologies and



Figure 8: Axial CT showing involvement of acromion and clavicle and other bones by multiple enchondromas.

present with variable clinical presentations and should be examined carefully when assessing images of the shoulder.

MRI is the superior modality for assessing AC joint pathologies.

Knowing the anatomy, the variants and normal appearances of AC joint is important for proper assessment of different pathologies.

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