

## CLINICAL CASE - TEST YOURSELF

## Musculoskeletal Imaging

# A 51-year-old male with shoulder pain and limited range of motion

Fatih Erdem, Emrah Akay, Bahar Yanık Keyik  
*Department of Radiology, Balikesir University Hospital, Balikesir, Turkey*

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## PART A

A 51-year-old male patient who had complaint of pain and limitation of movement in his left shoulder was admitted to our department with preliminary diagnosis of impingement. In another medical center, his condition was misdiagnosed as scapular fracture. While complete blood count test and other biochemical parameters such as creatinine, alanine aminotransferase, aspartate

aminotransferase levels were in the normal range, only significant laboratory finding was elevated C-reactive peptide level (18,6 mg/L). The only radiological study of the patient was a plain abdominal radiograph that was acquired 3 years ago (**Fig. 1**). Due to persisting symptoms an MRI (**Fig. 2**) and subsequent CT scan (**Fig. 3**) of the left shoulder were performed.

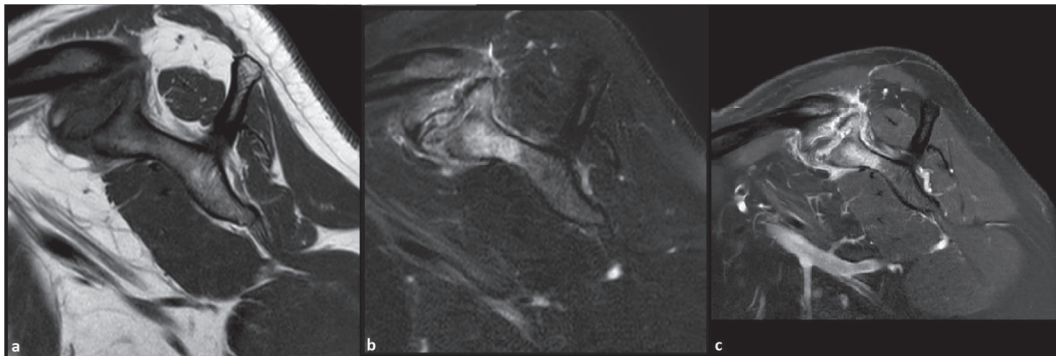


CORRESPONDING  
AUTHOR,  
GUARANTOR

Fatih Erdem, Department of Radiology,  
Balikesir University Hospital, 10145 Balikesir, Turkey,  
Email: mdfatiherdem@gmail.com



**Fig. 1.** Anteroposterior abdominal plain radiograph.



**Fig. 2.** **a.** Sagittal T1 weighted image, **b.** sagittal fat suppressed T2 weighted image, **c.** Sagittal post-gadolinium fat suppressed T1 weighted image.



**Fig. 3.** **a.** Sagittal oblique reformatted maximum intensity projection (MIP) computerized tomography (CT) image in bone window, **b.** Coronal oblique reformatted CT image in bone window, **c.** 3D surface rendering CT image.

## PART B

***Diagnosis: Coracoclavicular ligament ossification along with sternocostoclavicular hyperostosis in ankylosing spondylitis***

Ankylosing spondylitis is an inflammatory disorder of the axial skeleton involving the sacroiliac joints, discvertebral junction, apophyseal joints, costovertebral, costotransverse joints [1]. Progressive capsuloligamentous ossification is the hallmark of ankylosing spondylitis. Generally, the spine is involved, but extraspinal involvement also may occur [2]. Many radiologically detected alterations can also be found at sites other than the sacroiliac joints and the spine. These sites comprise sclerosis, erosion, and ankylosis of the cartilaginous joints (i.e., symphysis pubis, manubriosternal joint, and costosternal joints); erosion, joint space narrowing, and bony ankylosis in the hip and shoulder joints (peripheral joints are less frequently involved, especially in primary ankylosing spondylitis in developed countries); ossification of different ligaments, including coracoclavicular, iliolumbar, sacrospinous, and sacrotuberous; and erosion and new bone proliferation at different enthesal sites, more often in the lower extremities, especially the heels [1].

Sternocostoclavicular hyperostosis, bony erosions and ankylosis of the acromioclavicular joint, ossification of the coracoclavicular ligament may be rarely seen in the course of ankylosing spondylitis [2,3]. Because associations of these conditions with ankylosing spondylitis have been reported on the basis of individual cases in the literature so far, the exact incidence rate is not well known [3,4].

About half of the sternocostoclavicular hyperostosis cases are associated with palmoplantar pustulosis that can also be frequently associated with SAPHO (synovitis, acne, pustulosis, hyperostosis and osteitis) syndrome [3,4]. But the patient has denied the history of any skin lesions related and had the diagnosis of AS for 30 years. Because SAPHO syndrome is a diagnosis of exclusion, the presence of proven AS has excluded SAPHO syndrome.

Ossification in the coracoclavicular region results largely from trauma [5]. Also, renal failure patients may have coracoclavicular ligament calcifications, which corresponds to approximately 5% of them, but do not

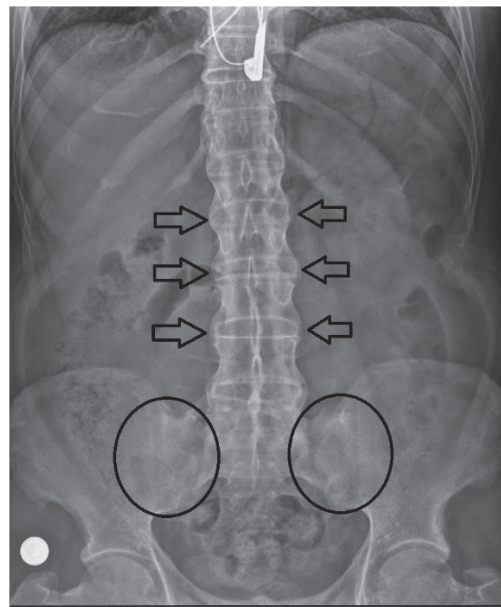
develop ossification [2]. The patient did not have renal failure or trauma history.

Shoulder impingement is a clinical syndrome in which soft tissues become painfully entrapped in the area of the shoulder joint. Impingement syndrome is one of the more common underlying diagnoses of shoulder pain. The subacromial impingement syndrome is by far the most common in practice among its causes. Advanced subacromial impingement syndrome is associated with rotator cuff defects [6]. Our patient didn't have any pathological signal consistent with tendinopathy or tear in rotator cuff muscle tendons. In our opinion limitation in the movement of our patient's left shoulder was due to ossification of the coracoclavicular ligament limiting scapular rotation, sternoclavicular hyperostosis which restricted the sternoclavicular joint movement and humeral head subluxation caused by atrophy of supraspinatus and infraspinatus muscles secondary to disuse. The pain in our patient's shoulder could be related to ongoing inflammation and restricted movement capability due to ankylosing spondylitis.

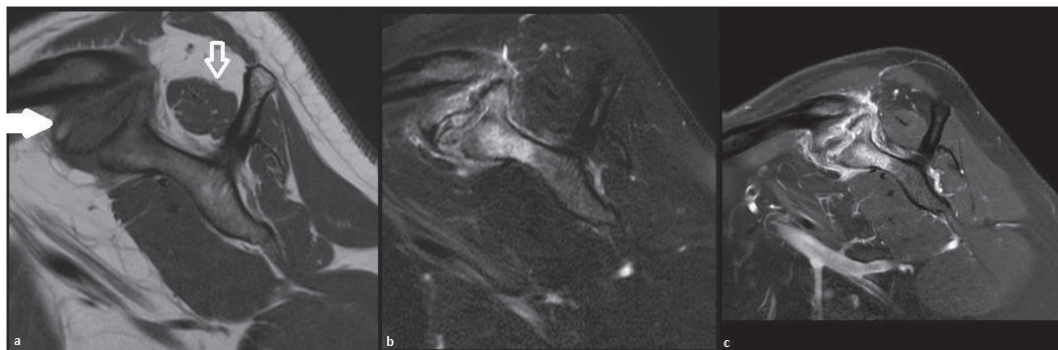
In the follow-up of the patient, after the anti-inflammatory medications were arranged, decrease in the CRP levels, MRI findings consistent with regression of inflammation and resolution of the shoulder pain were seen.

In conclusion, in the evaluation of the patients, who had pain and limited range of motion in shoulder, one should focus on also the ligaments around shoulder, sternocostal and sternoclavicular joints for the possible etiology, apart from humeroacromial interval and the glenohumeral joint. Coracoclavicular ligament ossification and sternocostoclavicular hyperostosis can develop in the course of ankylosing spondylitis and they can cause pain and limited range of motion in the shoulder.

The patient has had the diagnosis of ankylosing spondylitis for 35 years. Anteroposterior abdominal plain radiograph that was obtained 3 years ago showed marginal syndesmophytes at the spinal column and extremely narrowed bilateral sacroiliac joint spaces. Magnetic resonance imaging (MRI) showed signal intensity changes consistent with ossification, inflammation and oedema in the localization of coracoclavicular ligament, coracoid process and the mid-distal clavicle (**Fig. 2a, 2b**).



**Fig. 1.** Anteroposterior abdominal plain radiograph shows marginal syndesmophytes (some of them are showed by arrows) at the spinal column and symmetrical ankylosis/extreme narrowing of bilateral sacroiliac joint spaces (within the circle).



**Fig. 2. a.** Sagittal T1 weighted image shows coracoclavicular ligament ossification (**solid arrow**) and atrophy of supraspinatus muscle (**outline arrow**). **b.** Sagittal fat suppressed T2 weighted image shows inflammatory and oedematous signal intensity changes in the ossified coracoclavicular ligament, medullary bone of the coracoid process and the mid-distal clavicle, also in the surrounding soft tissues. **c.** Sagittal post-gadolinium fat suppressed T1 weighted image shows enhancement in the ossified coracoclavicular ligament, medullary bone of the coracoid process and the distal clavicle, also in the surrounding soft tissues consistent with inflammation.



**Fig. 3. a.** Sagittal oblique reformatted MIP CT image shows incomplete ossification of coracoclavicular ligament (**within the circle**) and the synchondrosis (**arrowheads**). **b.** Coronal oblique reformatted CT image shows sternocostoclavicular hyperostosis (**within the circle**). **c.** 3D surface rendering CT image shows incomplete ossification of the coracoclavicular ligament (**within the grey circle**) and sternocostoclavicular hyperostosis (**within the white circle**).

There were inflammatory signal changes and contrast enhancement in the surrounding soft tissues and the related bone structures due to reactive hyperaemia secondary to the inflammatory process (Fig. 2c). These findings were considered to be reflecting the progressive inflammatory process leading to ossification of the coracoclavicular ligament, in ankylosing spondylitis. Furthermore, MRI showed atrophy of infraspinatus and supraspinatus muscle due to disuse, subluxation of the humeral head and degenerative hypertrophic changes in the acromioclavicular joint. CT images obtained for further evaluation showed sternocostoclavicular hy-

perostosis in addition to the incompletely ossified coracoclavicular ligament (Fig. 3a, 3b, 3c). **R**

#### **Ethical approval**

Written informed patient consent for publication has been obtained.

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#### **Conflict of interest**

The authors declared no conflicts of interest.



#### KEY WORDS

Coracoclavicular ligament ossification, sternocostoclavicular hyperostosis, ankylosing spondylitis, extraspinal involvement

## REFERENCES

1. Olivieri I, D'Angelo S, Palazzi C, et al. (2009) Diffuse idiopathic skeletal hyperostosis: differentiation from ankylosing spondylitis. *Curr Rheumatol Rep*; 11(5):321-328
2. Chen YM, Bohrer SP (1990) Coracoclavicular and coracoacromial ligament calcification and ossification. *Skeletal Radiol*; 19(4):263-266
3. Tamai K, Mashitori H, Saotome K, et al. (1998) HLA-B27-negative ankylosing spondylitis resulting in panclavicular ligament ossification—a 28-year follow-up. *Acta Orthop Scand*; 69(3):323-325
4. Carroll MB (2011) Sternocostoclavicular hyperostosis: a review. *Ther Adv Musculoskelet Dis*; 3(2):101-110
5. Pritchett JW (1983) Ossification of the coracoclavicular ligaments in ankylosing spondylitis. 156 A case report. *J Bone Joint Surg Am*; 65(7):1017-1018
6. Garving C, Jakob S, Bauer I, et al. (2017) Impingement syndrome of the shoulder. *Dtsch Arztebl Int*; 114(45):765.



#### READY-MADE CITATION

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