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# A BARE AREA OF THE GLENOID MISDIAGNOSED AS A CARTILAGE ULCERATION

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**We report on a 17-year-old girl who developed shoulder pain after a fall on an outstretched arm. CT arthrography and MR imaging demonstrated a cartilage defect centrally located in the glenoid. This was accompanied by an eroded appearance of the underlying bone. Since symptoms persisted over several months it was initially thought this represented a cartilage injury. Subsequently arthroscopy was performed and the abnormality was identified as a bare area of the glenoid. A tear of the superior glenohumeral ligament was depicted and was repaired. The bare area is an oval area denuded of cartilage that is probably developmental and that should be differentiated from true cartilage injuries to avoid unnecessary interventions. An eroded appearance of the underlying bone may occur on imaging, a finding that has not been previously reported.**

**Key-words: Shoulder, MR – Shoulder, arthrography.**

In the young, focal cartilaginous lesions of the glenoid and humeral head may occur after shoulder injuries such as dislocations (1). In the elderly, diffuse cartilaginous thinning occurs in the setting of degenerative disease. The shoulder is often examined at first with ultrasound, but with this technique the cartilage can not be visualized. MR imaging allows a better visualization of cartilage defects but ideally CT or MR arthrography are performed to evaluate the cartilage of the shoulder (1, 2). When focal cartilage lesions occur they may be amenable to therapeutic interventions such as ice picking or cartilage transplantation (3).

It is important to differentiate a cartilage injury from a developmental abnormality designated the bare area of the glenoid cartilage to avoid unnecessary interventions. Imaging findings can be misleading and as a result unnecessary arthroscopy may be performed. In the present patient, both CT arthrography and MR imaging were interpreted as a cartilage lesion with disruption of the underlying cortex. At arthroscopy, however, a non pathological bare area was found.

## Case report

A 17-year-old girl was referred to the orthopedic clinic for right shoulder pain. According to the patient the symptoms had started 10 months earlier after a fall on an outstretched arm during athletic activity. Pain was also present in the neck and the entire arm. She experienced pain when sleeping on the affected side. During elevation she subjectively experienced a painful cracking sensation. On clinical examination no limitation of the range of motion was evident. A cracking noise was depicted with certain arm movements. The area of the trapezius muscle and shoulder area were sensitive to palpation. No instability signs were elicited. Jobes test was painful. The findings of other tests included: hyperabduction test, 100°; abduction external rotation test, 90°; and adduction external rotation test, 80°. On the basis of these findings the possibility of a minor instability was entertained.

Radiography was unremarkable (Fig. 1). Ultrasound was performed and showed a moderate tendinopathy of the anterior third of the supraspinatus tendon. CT arthrography was performed and the report mentioned the presence of a deep cartilaginous ulceration in the midportion of the glenoid accompanied by slight irregularity of the subchondral bone (Fig. 2). The labrum and rotator cuff appeared normal. Treatment consisted of counceling, hyaluronic acid injections, and physical therapy. These treatments remained unsuccessful and symptoms were still present six months later. MRI of the shoulder was performed and showed a region of focal cartilage abrasion with denuded bone at the middle third of the glenoid. The findings were similar to the previous CT findings.

The decision was made to perform arthroscopy and the possibility of performing the ice picking technique was entertained. At arthroscopy a tear of the superior glenohumeral ligament with a HAGL lesion was discovered. The described cartilage lesion on imaging studies, was recognized at arthroscopy as a focal area of cartilage thinning about at the center of the glenoid measuring 1 cm in diameter. It was identified as a bare area of the glenoid and not as a traumatic injury. The superior glenohumeral ligament injury was sutured. Postoperative evolution was unremarkable with resolution of pain symptoms.

## Discussion

The bare area of the glenoid has only been described in very few articles (4). Some texts report the bare area to be relatively common (5). However, we believe they refer to an area were the cartilage becomes thinner in the mid third of the glenoid cavity accompanied by a slight protrusion of the underlying bone. This likely corresponds to the presence of a grey spot ('tache grisatre') reported by Testut and Latarjet (6). It has been suggested that this corresponds to an area of increased compressive loading (7). Although the cartilage becomes thinner at the central third of the glenoid cavity, a deep cartilaginous defect, in our experience, is a very uncommon finding. Anatomically the bare area measures 5-10 mm in width, has a slightly blue appearance and may show some fibrillations at the edges (5). It is still debated whether it represents an acquired or developmental abnormality (4).

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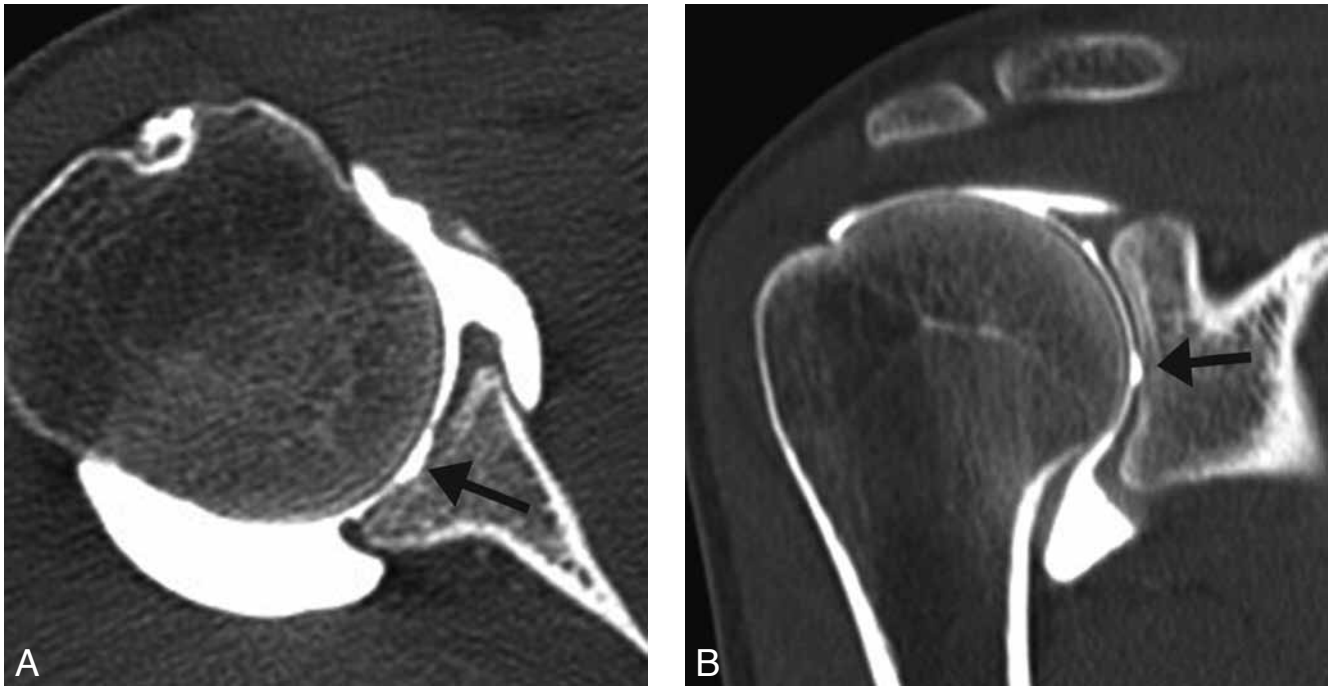


*Fig. 1.* — Transverse (A) and coronal (B) CT arthrography image. Note cartilage defect filling with contrast medium (arrow). Also note irregularity of the underlying bone.

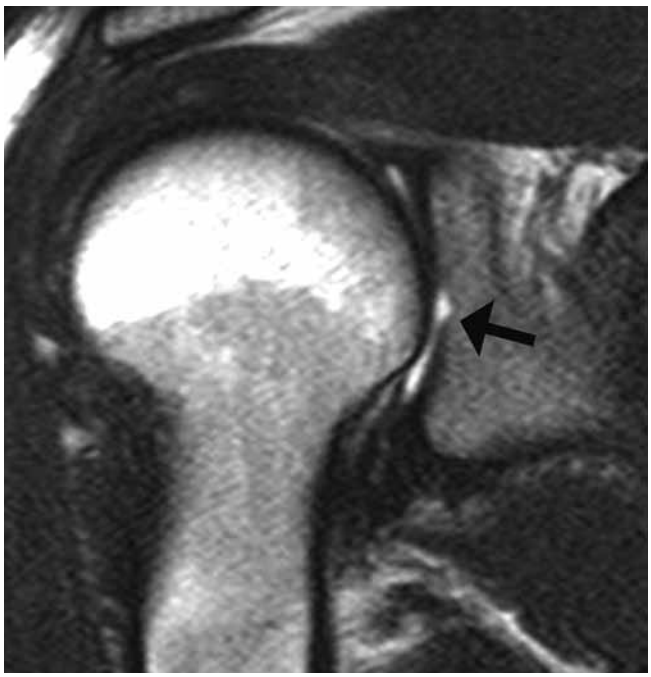

*Fig. 2.* — Coronal proton density weighted MR image. Note defect in the cartilage filling up with a moderate amount of joint fluid (arrow).

No clinical symptoms have been attributed to its presence. Of note, our patient did undergo a traumatic event which would raise the possibility of a traumatic cartilage lesion. The patient in our series was young, corresponding to previously reported findings (4). The clinical importance lies in the fact that it may be mistaken for focal cartilage trauma in which case clinical symptoms would occur and treatments such as icepicking or cartilage transplantation ( 3) could be considered.

On radiographs no abnormalities of the glenoid joint have been described although there may be some increased sclerosis or a bony bump underlying the area. Ultrasound is unable to show the glenoid cartilage and is better suited for assessment of the structures of the rotator cuff. On CT studies the cartilage is poorly identified and although no reports exist it may be assumed this study would be normal. CT arthrography is probably the most valuable technique to show the bare area. Contrast can be seen entering a smoothly marginated rounded focal cartilage defect about at the center of the glenoid and also the glenoid cortical bone can be evaluated in detail. In our case slight deformity of the underlying bone was seen, although no focal sclerosis was evident underlying the lesion. Consecutive slices can show the defect is very focal. However, without knowledge of the existence of this variant it could still be interpreted as a cartilage injury. Findings would be similar on MR arthrography, but MR would be less suited to evaluate the underlying bone. The cartilage can be visualized on MR imaging studies without intraarticular contrast injection if some fluid is present and hence the bare area can also be appreciated on plain MR images again showing a focal area of cartilage thinning at the center of

the glenoid. At arthroscopy an area of focal cartilage thinning can also be observed. It may show some superficial fibrillations (5). Increased subchondral density has been reported, but was not observed in our case. Instead, we noticed cortical irregularity on CT imaging. Ultrasound is not able to play a role in the recognition of this variant.

The bare area should be differentiated from osteochondral defects, glenoid labral articular disruption (GLAD) lesions, and degenerative or traumatic areas of cartilage thinning.

Osteochondral defects and GLAD lesions do not typically occur in the central area of the glenoid helping in differentiation. Degenerative cartilage thinning is more diffuse and multiple areas of cartilage abrasion may occur. GLAD lesions involve the anteroinferior labral area and hence are easily differentiated from the bare area.

Traumatic cartilage injuries usually occur after dislocations and are usually accompanied by labral lesions or Hill Sachs lesion (1)

In summary, the bare area of the glenoid should be recognized as a specific entity on CT arthrography, MR, or MR arthrography studies, to avoid misinterpretation as a traumatic cartilage injury and subsequent unnecessary procedures. Irregularity of the underlying cortex can occur, a finding that has not been previously reported.

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