MRI of acromioclavicular joint dislocation
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Section: Musculoskeletal system
Case Type: Clinical Cases
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Patient: 52 years, male

Clinical History:
This is a case of a 52 year old man who fell on his outstretched right arm in a cycling accident.

Imaging Findings:
A 52 year old man was referred for an MRI of the right shoulder, 5 days after breaking a fall from his bicycle with his right arm. He reported that while he was riding uphill, the chain suddenly jammed and stopped the rear wheel of his bike, which threw him off the saddle. Conventional 2-plane radiographs of the shoulder, performed in the emergency room, reportedly showed a dehiscence and only a slight piano key deformity of the AC joint. There were no signs of fractures. Conservative, ambulatory treatment of AC joint dislocation was initiated at first. However, the patient experienced massive pain and restricted movement refractory to analgesics. MRI was prescribed by the orthopaedic surgeon to exclude further damage and determine the need for surgical fixation. The examination was performed on a multichannel 1.5 T whole body scanner (Signa Hdx, GE Healthcare Milwaukee, WI, USA) using a 4-channel phased-array shoulder coil. A standard shoulder protocol was used including paracoronal T1 SE and T2 FSE fatsat, parasagittal T2 FSE and transverse T2* GRE 2D images (Figs. 1-4). MRI visualised complete disruption of the acromioclavicular (AC) and coracoclavicular (CC) ligaments and revealed additional lesions of the deltoid and trapezius muscle fibre insertions on the clavicle. Based on these findings, the lesion was reclassified as Rockwood V and subsequently treated by internal fixation.

Discussion:
Acromioclavicular (AC) injuries account for more than 10% of shoulder injuries. A fall on the outstretched arm in younger individuals, aside from fractures, more frequently leads to AC joint injuries than to lesions of the rotator cuff or the glenohumeral joint. AC subluxations and dislocations are traditionally characterised with history, physical examination, and routine radiography including adduction-distraction or loaded views (the latter were not performed in the present case). In many cases of AC joint injuries, however, due to compensatory mechanisms, the complete extent of the injury is not sufficiently documented by conventional methods. MR imaging provides an exquisite contrast between the soft-tissue, bony and ligamentous structures of not only of the shoulder joint but the whole shoulder girdle, depending on the coverage of the coil array and the field of view used. The classification system of AC joint injuries, originally devised by Allman et Tossy, and revised by Rockwood, defines the extent of injury and helps to guide the treatment. In general, Rockwood type I and II injuries with intact or partially torn CC ligaments are treated with short-time immobilisation, analgesics and subsequent physical therapy. On the other hand, lesions with posterior or inferior clavicular dislocation (Rockwood type IV and VI), or concomitant lesions of the deltoid and trapezius muscular insertions (type V), nearly always require operative intervention. Rockwood type III lesions, consisting of complete ruptures of the AC and CC ligaments, without concomitant muscular injuries and only moderate upward clavicular dislocation have always been at the edge between conservative and surgical...
management. However, at least one large systematic review suggests that the current evidence does not support surgical treatment of grade III AC dislocations with respect to overall patient satisfaction as well as clinical outcomes. However, in a survey conducted among German trauma departments, 84% of the clinics would operate on type III AC injuries, especially in athletes or overhead workers. Although there are no substantial studies to date, it may be hypothesised that MRI is more accurate in depicting the extent of AC injuries than conventional radiography, for it can detect incomplete AC or CC lesions without dislocation in Rockwood types I-III and visualise muscle injuries in type V. Posterior or inferior dislocations of the clavicle are equally well detected on radiographs or CT.

Differential Diagnosis List: Acromioclavicular joint dislocation Rockwood type V.

Final Diagnosis: Acromioclavicular joint dislocation Rockwood type V.

References:
**Description:** Coronal obl. T1 SE image through the AC joint showing superior dislocation of the lateral clavicle and a complete loss of articulation with the acromion. **Origin:**
Description: Fat saturated, T2 FSE image at the same plane as Fig. 1a. There is diffuse hemorrhage around the lateral end of the clavicle. The acromioclavicular ligaments are completely disrupted. The bony structures exhibit normal signal intensities. Origin:
Figure 2

*Description:* Paracoronal fatsat T2 FSE image more anterior than Fig. 1b showing a massive hematoma in the widened space between the clavicle and the coracoid process. Also note the muscle fibre tear in the proximal deltoid. *Origin:*
Description: Parasagittal T2 FSE without fatsat perpendicular to Fig. 2a facilitating the delineation of the hypointense subacute hematoma (H). Depiction of the coracoacromial ligaments is impossible due to complete disruption. Origin:
Description: A section more posterior than Fig. 1 reveals extensive injury of the clavicular insertion of the trapezius muscle (arrow). Origin:
Description: A transverse section through the lateral clavicle excludes posterior dislocation with respect to the trapezius muscle (as in Rockwood IV). Note the susceptibility artifacts lateral to the clavicle caused by paramagnetic hemoglobin degradation products. This is not part of the acromion (see Fig. 1). Origin: