

Cuff tear arthropathy with hemarthrosis

A report on 3 elderly patients

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Submitted 96-03-02. Accepted 96-08-22

Case 1

An 87-year-old right-handed man presented to the emergency department with a spontaneously swollen right shoulder. He had a large effusion of the right shoulder, with a yellowish ecchymosis on the anterior aspect of the shoulder. Shoulder motion was restricted and painful. 1 month earlier he had started NSAID treatment because of generalized joint and muscle pain. He stopped taking NSAID after 2 weeks when he developed a bleeding ulcer.

ESR was 110 mm/h, CRP 70 mg/L, hemoglobin 105 g/L, s-Ca 2.18 mmol/L, serum parathyroid hormone (s-iPTH) 65 ng/L (normal value 8–51). Blood coagulation factors, platelets and leucocyte counts were normal.

45 mL of blood-stained synovial fluid was evacuated from the joint. Cultures were negative. No urate or pyrophosphate crystals were found. Alizarin red S staining revealed no calcium compounds (Paul et al. 1983). Over the following days, from 35 to 60 mL of bloody synovial fluid was aspirated daily from the joint.

A radiograph showed cystic changes in the humeral head, with glenoid erosions and cranial migration of the humeral head.

Isotope scans showed increased activity in both shoulders. CT demonstrated bilateral cuff ruptures. In the right shoulder, a distended subdeltoid bursa was present and there was a marked thickening of the anterior capsule.

An angiography demonstrated numerous small vessels leading to the anteromedial part of the glenohumeral joint, with pooling of the contrast medium. MRI revealed a soft tissue swelling anterior to the glenoid and a large subdeltoid effusion in the presence of a cuff rupture (Figure 1).

An arthroscopy confirmed the absence of the rotator cuff and there was an organized hematoma in the joint. No bleeding points in the soft tissues were found. There was a pronounced arthrosis in the glenohumeral joint.

During the following weeks, oral cyclocaprone was prescribed and local cortisone was instilled on 4 occasions into the glenohumeral joint. The swelling and

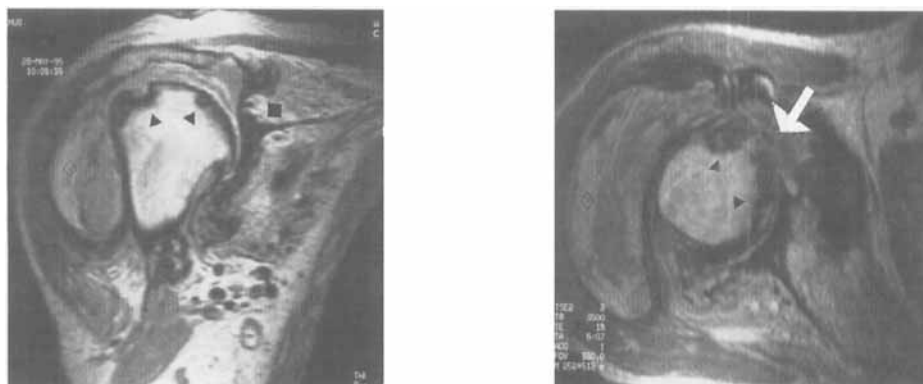


Figure 1. Case 1. A proton-density (PD) frontal (left) and coronal (right) MR scan demonstrating the large subdeltoid effusion (◇), soft tissue swelling anterior to the glenoid (white arrow), bone resorption of the humeral head (▲) and rupture of the rotator cuff (■) of the right shoulder in an 87-year-old right-handed man.



Figure 2. Case 2. Swelling and discoloration of the skin around the right shoulder in an 86-year-old woman with hemorrhagic cuff tear arthropathy.



Figure 3. Case 2. Anteroposterior radiograph of the right shoulder disclosing proximal migration of the humeral head with glenohumeral joint resorption and soft tissue calcifications.

pain did not subside. After 4 months, a humeral head replacement was performed.

At the operation, the joint was distended by synovitis. The anterior capsule was darkly stained and thickened. The biceps tendon was flattened and widened. The humeral head was soft, without any remaining cartilage. A modular type shoulder hemi-prosthesis was used. The postoperative course was uneventful.

On microscopy, the humeral head showed signs of long-standing increased bone formation and resorption. The synovial membrane was severely degenerated, with abundant necrosis, fibrin deposits, fresh bleeding and numerous hemosiderin-containing macrophages. Small areas of reactive synovitis, with proliferation of histiocyte-like cells and papillary projections were found, but there were no changes compatible with villonodular synovitis.

Case 2

An 86-year-old right-handed woman presented to the emergency department with a painful right shoulder. It was red and swollen (Figure 2). Active and passive motions were impaired.

3 years earlier she had taken oral steroids for temporal arteritis, which resolved after 1 year of treatment. She was presently taking NSAID for hip pain.

Radiographs of the right shoulder showed a high-riding humeral head, erosions in the area of the surgical neck and degenerative changes in the glenohumeral joint, with chondrocalcinosis (Figure 3).

MRI revealed bilateral cuff ruptures with bloody effusion in and around the right shoulder (Figure 4) and, on CT, pronounced erosions of the glenoid and resorption of the humeral head were evident.

The synovial fluid was blood-stained and contained crystalline material, probably pyrophosphate crystals. Alizarin red-S staining was not performed. Cultures were negative. ESR, CRP, hemoglobin and leucocytes were normal as also were S-Ca and S-P and s-PTH.

Following one intraarticular steroid injection, the swelling and discoloration subsided and the function of the shoulder increased during the following weeks. NSAID treatment was continued because of persistent hip pain.

Case 3

An 85-year-old right-handed man experienced a sudden swelling of the dominant shoulder without trauma, but after a day of heavy manual labor. 1 week later, during medical treatment for the pain and swelling, blood-stained synovial fluid was aspirated from the shoulder. Another aspiration of bloody joint fluid was done after 2 weeks. Synovial fluid cultures were negative.

The patient had knee arthrosis. In joint fluid from the knee, urate and pyrophosphate crystals were found. ESR was 25 mm/h, CRP 9 mg/L, while leucocytes were $13.5 \times 10^9/L$ and s-urate 490 $\mu\text{mol/L}$ (normal value 160-450).

Radiographs showed an unstable humerus that eas-

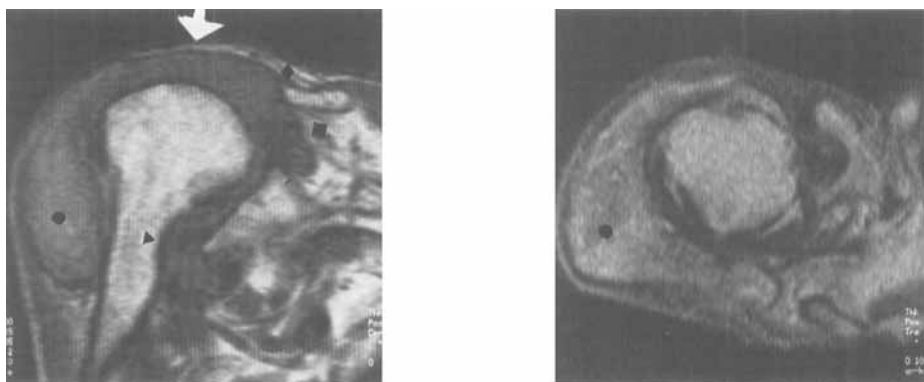


Figure 4. Case 2. A frontal T₁ (a) and coronal PD (b) MR scan showing a large subdeltoid bursa (●), atrophic deltoid muscle (white arrow), resorption of the proximal humerus (▲) and complete rupture of the rotator cuff (■).

ily subluxated caudally, with erosions in the area of the greater tubercle. Degenerative changes in the glenohumeral joint, with a caudal osteophyte on the humeral head and a reduced joint space, were also present.

MRI showed a subdeltoid hematoma and a complete rupture of the supraspinatus tendon, together with a pronounced atrophy of the infraspinatus and the subscapularis muscles.

Treatment with NSAID reduced the pain. The patient died 3 weeks later from a myocardial infarction.

Discussion

For hemarthrosis of the shoulder together with severe joint destruction, several differential diagnoses must be considered, including cuff tear arthropathy, tumor, infection, villonodular synovitis, neuropathic conditions, rheumatoid arthritis, and coagulopathy.

Pain and restricted range of motion, with destruction of the shoulder joint and concomitant chondrocalcinosis, rotator cuff tear and upward migration of the humeral head, are classical features of cuff tear arthropathy. This condition has been described using various terms: senescent hemorrhagic shoulder, rapidly destructive idiopathic joint disease, idiopathic destructive shoulder arthropathy and "Milwaukee shoulder" (McCarty et al. 1981). Hemarthrosis as the presenting symptom of cuff tear arthropathy is an uncommon finding. McCarty (1994) found 8 cases of cuff tear arthropathy with hemarthrosis when searching the literature. Neer (1983) noted that 5 of 26 patients with cuff tear arthropathy had hemarthrosis and ecchymoses around their shoulder.

In order to establish the diagnosis, MRI is recommended but arthroscopy and angiography are of no great help.

It has been postulated that cuff tear arthropathy represents the combination of a rotator cuff tear, a crystal-induced synovitis and cartilage damage leading to arthrosis (Halverson et al. 1984). Although the hydroxyapatite crystals present in cuff tear arthropathy joint fluid could be a secondary finding caused by a passive leak from damaged bone, many patients with cuff tear arthropathy syndrome exhibit chondrocalcinosis (Halverson et al. 1984). Numerous cuff ruptures are bilateral. Since symptoms in the majority of cases appear only on the dominant side, there seems to be a mechanical component in the development of this disease (Neer et al. 1983).

One case of cuff tear arthropathy with primary hyperparathyroidism has been reported (Ter Borg et al. 1995). Chondrocalcinosis is common in primary hyperparathyroidism (Pritchard and Jessop 1977). One of our patients had, indeed, a slight increase in iPTH, but no other evidence of hyperparathyroidism was present, such as elevations of s-Ca or s-iCa.

Instillation of cortisone into the joint is in many cases followed by a reduction of symptoms, and cycloapron treatment has been suggested, as well as joint irrigation (Caporali et al. 1994). When pharmacological treatment fails, a humeral head replacement may be indicated.

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