The acute first-time anterior shoulder dislocation (AFASD)
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Chapter 11

A fracture of the coracoid process, the greater tuberosity and the glenoid rim after an acute first-time anterior shoulder dislocation

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A fracture of the coracoid process, the greater tuberosity and the glenoid rim after an acute first-time anterior shoulder dislocation.

A case report

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Introduction
Anterior shoulder dislocations can cause different kinds of complications, such as fractures of the greater tuberosity and glenoid fractures. We present a case of a patient with an acute first-time anterior shoulder dislocation and associated fractures of the coracoid process, the greater tuberosity and glenoid rim. To our knowledge, this combination of fractures with a dislocation of the shoulder has not been described in the literature before.

Case report
A 73-year-old right-handed woman fell 2 meters backward into a ditch during her holiday in Greece. She landed on her right shoulder, had immediate pain, and could not use her right arm. Radiographic evaluation in the local hospital showed an anterior shoulder dislocation with a fracture of the greater tuberosity. The shoulder was reduced and the arm was immobilised in a sling. One week later, the patient visited our orthopaedic department. On clinical investigation, we found a large hematoma on the right upper arm. The neurovascular examination was normal. Plain radiographs of the affected shoulder showed a normal position of the humeral head. There were fractures of the greater tuberosity, the glenoid rim and the coracoid process on the axillary view. (Fig.1) A computed tomography scan revealed the fractures without large displacement. (Fig.2) We treated this injury nonoperatively. Radiographs after 2 weeks showed no change of the fracture fragments. At review 6 months after the injury, the patient still had mild pain without instability. The range of motion of the shoulder was active elevation, 140°, external rotation, 35°, internal rotation, TH 9. The pain score on a Visual Analogue Scale was 2 (0, no pain; 10, severe pain). The Constant score was 89. Plain radiographs showed consolidation of the fractures (Fig. 3). The patient would choose the same treatment again.

Figure 1: Axillary (A) and 45° cranio-caudal (B) views of shoulder after reduction.
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Discussion.
Greater tuberosity fractures in association with anterior shoulder dislocations are not rare. Approximately 15% to 35% of all anterior shoulder dislocations have a greater tuberosity fracture. Johnson and Bayley found in their series of the Royal National Orthopaedic Hospital in London a 24% incidence of these fractures after anterior shoulder dislocation. Visser in his thesis (1998) reported 14 (18%) patients with a fracture in 77 patients with an acute first-time shoulder dislocations. Twelve (15.6%) of these 14 patients had a greater tuberosity fracture. Two of the 14 patients had a glenoid rim fracture. The mean age of these 14 patients was 69.2 years (range 32.5 to 88.6 years). Also well known are glenoid rim fractures after anterior shoulder dislocations. The incidence ranges from 5.4% to 32%.
In contrast to the above-mentioned fractures, the coracoid process fracture, first described by Desault in 1768, is a rare injury. The reported incidence is between 3% and 13% for fractures around the shoulder. Most reports of coracoid fractures are isolated cases. The most frequently reported associations of a fracture of the coracoid are acromioclavicular dislocations, followed by fractures of the clavicula and shoulder dislocations. Despite that dislocation of the shoulder is a common disorder, we could only find 10 reported cases in the literature on shoulder dislocations with simultaneous a fracture of the coracoid. (Table 1.)

Table 1. Reported cases on anterior shoulder dislocations with either fractures of the coracoid process, glenoid and/or greater tuberosity.

<table>
<thead>
<tr>
<th>Author</th>
<th>Journal</th>
<th>Patients (n=)</th>
<th>Fracture of coracoid</th>
<th>Fracture of greater tuberosity</th>
<th>Fracture of glenoid</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchetti &amp; Friedman</td>
<td>JBJS 1979</td>
<td>1</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>Spontaneously</td>
</tr>
<tr>
<td>Garcia-Elias &amp; Salo</td>
<td>JBJS 1985</td>
<td>1</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>Closed</td>
</tr>
<tr>
<td>Wong-Chung &amp; Quinlan</td>
<td>Injury 1989</td>
<td>1</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>Open Blocked Coracoid</td>
</tr>
<tr>
<td>Goodier et al.</td>
<td>Injury 1994</td>
<td>1</td>
<td>+</td>
<td>+ after epileptic</td>
<td>-</td>
<td>Closed</td>
</tr>
<tr>
<td>Saragaglia et al.</td>
<td>Rev Chir Orthop 1994</td>
<td>3</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>Closed</td>
</tr>
</tbody>
</table>

The first publications on this combined injury of anterior shoulder dislocation and fracture of the coracoid process were from Benchetrit and Friedman and Garcia-Elias and Salo. They both described a patient with a nonunion of the coracoid process after an anterior shoulder dislocation. A case of a patient in which the associated fracture of the coracoid process prevented the closed reduction of the shoulder dislocation was reported by Wong-Chung and Quinlan.

Tijmes et al. found in their arthrography study, performed on 50 patients with an acute shoulder dislocation, a fracture of the coracoid process in 2%. Hovelius et al. also found this fracture of the coracoid process in 2 patients in a series of 226 first-time anterior shoulder...
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Dislocations (1%).\textsuperscript{10} In one of them, the fracture was visible only on radiographs with the shoulder in a dislocated position, while the radiograph made after reduction was normal. McLaughin and MacLellan reported eight (1.4%) fractures of the coracoid process in 580 patients with a shoulder dislocation, an incidence that corresponds well to the study of Hovelius.\textsuperscript{10,14} According to Garcia-Elias and Salo it seems likely that many similar cases of coracoid process fractures have been undetected, because it is difficult to diagnose coracoid fractures on a plain anteroposterior radiograph.\textsuperscript{6} The axillary view is proposed by most authors as the best view to detect these fractures.\textsuperscript{2,19,20}

Goodier et al. reported the only case of the combination of a greater tuberosity fracture and a fracture of the coracoid process after an epileptic insult prior to reduction of an already dislocated shoulder without fractures.\textsuperscript{8} Recently, Cottias et al. reported a bilateral case of a fractured coracoid with an anterior shoulder dislocation and greater tuberosity fracture.\textsuperscript{4}

To our knowledge, there have been no previous publications of simultaneous fractures of the greater tuberosity and coracoid process after a shoulder dislocation with a glenoid rim fracture. However, in the article of Cottias et al., they mentioned that the shoulder remained unstable after reduction because of a fracture of the anterior glenoid cavity.\textsuperscript{4}

The mechanism of injury in our case is probably the result of direct trauma of the dislocated humeral head against the glenoid and coracoid process. Strong traction on the coracoid, leading to an avulsion, is also suggested by Garcia-Elias and Salo.\textsuperscript{2,6} Treatment of this injury should be primarily reduction of the shoulder. The greater tuberosity should be treated operatively if there is displacement of more than 0.5 to 1 cm. Most coracoid fractures are minimally displaced and usually heal well with conservative treatment. Large fragments (more than 25-33%) of the glenoid could lead to recurrent instability, so operative reduction is advised.
References.

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