Trauma Case Reports 17 (2018) 9–13

Contents lists available at ScienceDirect

Trauma Case Reports

journal homepage: www.elsevier.com/locate/tcr

Case Report

Inferior shoulder dislocation after shortening osteotomy of the humerus. A case report

M. Ceynowa*, M. Treder, F. Dąbrowski, M. Piotrowski, R. Pankowski, M. Rocławski

Departament of Orthopedic Surgery, Medical University of Gdańsk, Poland
Ul. Nowe Ogrody 1-6, 80-803 Gdańsk, Poland

ARTICLE INFO

Keywords:
Humerus
Pseudoarthrosis
Shoulder dislocation
Humerus osteotomy

SUMMARY

We present a case of a post-surgical complete dislocation after excessive proximal humeral shortening osteotomy performed in a patient operated on for atrophic non-union of a proximal humeral fracture. This complication has not been previously reported.

The dislocation occurred due to extensive laxity of the soft tissue envelope, predominantly the deltoid muscle, as well as rotator cuff tear.

The reconstructive procedure consisted of vertical duplication of the capsule, reinforcement of the repair with coracoacromial ligament, tenodesis of the long head of the biceps tendon to the conjoined tendon and distal transfer of the deltoid muscle. The repair was reinforced with transarticular Steinmann pins. 15 months after surgery, there is an inferior subdislocation present, with full reduction in active abduction. Patient is pain-free at rest, and pain grade 4 in VAS scale in activity with loading.

Introduction

Inferior dislocation of the shoulder is a rare condition. Typically, it occurs after a traumatic event. In a non-traumatic setting, the shoulder joint may sublux inferiorly due to muscular insufficiency, mostly of the supraspinatus muscle [1].

We present a case of a post-surgical complete dislocation after proximal humeral shortening osteotomy performed in a patient operated on for atrophic non-union of a proximal humeral fracture. A individually designed original surgical procedure is described in detail.

Case report

A 55 year old female was referred with a pseudoarthrosis of the left proximal humerus (Fig. 1). The fracture was treated operatively a year earlier.

During surgery, there was a severe bone loss of the distal fragment. The insertion of the pectoral muscle was absent, the tendon of the long head of the biceps was lacerated, and there was a partial tear of the rotator cuff. The capsule was opened along the intertubercular groove to inspect the joint. The pseudoarthrosis was resected with shortening of 6 cm of the bone and fixed with a plate. The capsule was closed with sutures.

Next day, the postoperative standing radiograph showed a complete inferior dislocation of the humeroscapular joint (Fig. 2). The deltoid muscle was bulky, but had palpable contraction. The skin sensibility on the lateral aspect of the shoulder was normal.

* Corresponding author at: Ul. Nowe Ogrody 1-6, 80-803 Gdańsk, Poland.
E-mail address: mceynowa@gumed.edu.pl (M. Ceynowa).

https://doi.org/10.1016/j.tcr.2018.09.003
Accepted 18 September 2018
Available online 26 September 2018

Fig. 1. Pseudoarthrosis of the proximal humerus.

Fig. 2. Postoperative inferior dislocation in AP view.

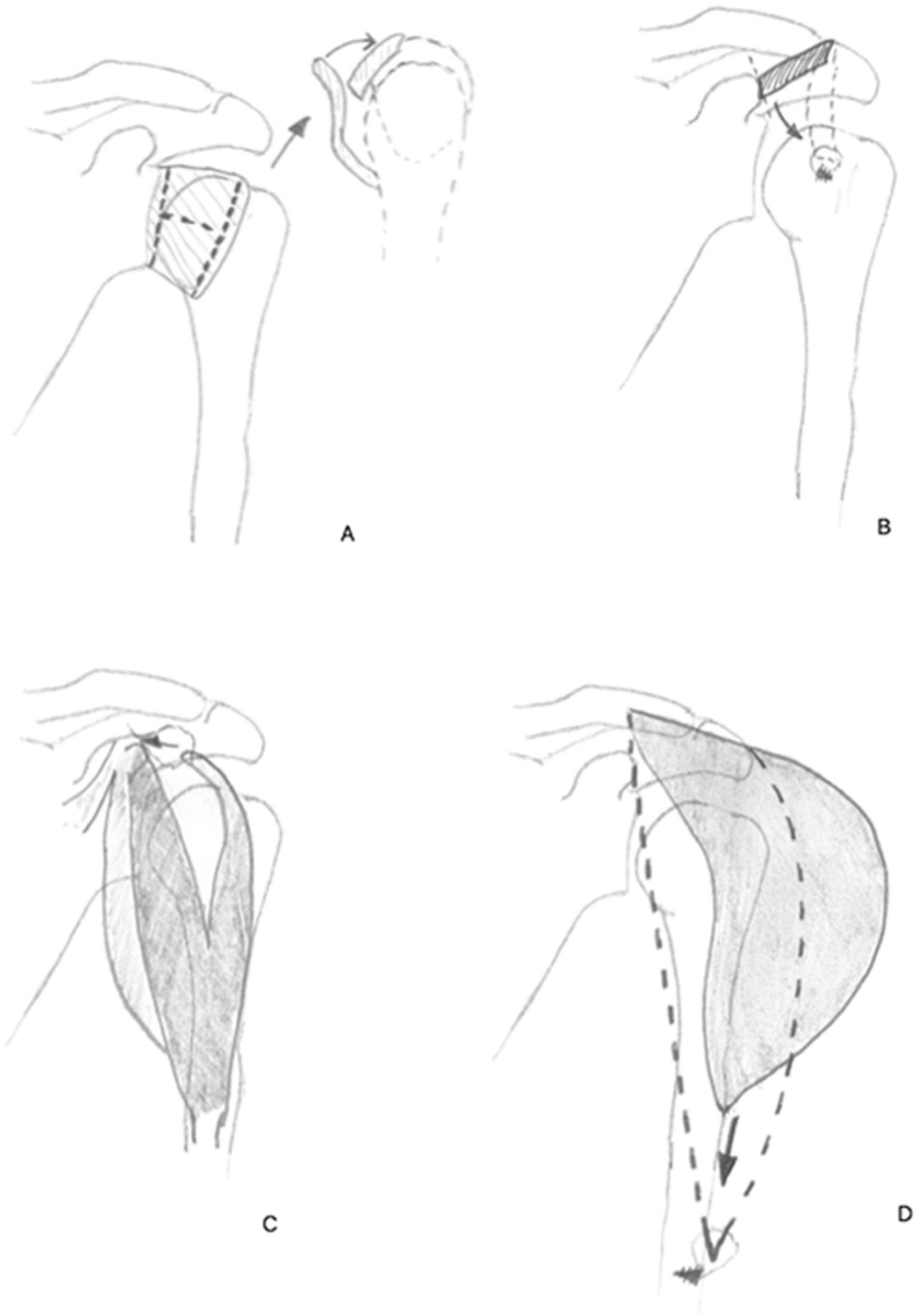

Fig. 3. A. Vertical duplication of the capsule. B. Reinforcement of the repair with coracoacromial ligament. C. Tenodesis of the long head of the biceps tendon to the conjoined tendon. D. Distal transfer of the deltoid muscle.

The cause of the dislocation was considered to be caused by soft tissue insufficiency, caused mainly by excessive shortening of the humerus between the insertions of the deltoid muscle.

Surgery was performed on the next day. The capsule sutures had failed. The repair was done as shown in Fig. 3A–D. The partial tear of the rotator cuff was irreparable. Intraoperatively we achieved joint reduction and good tension of the transferred deltoid. The arm was supported with orthosis.

Postoperatively, the standing radiograph showed a relapse of the dislocation. The patient did not report any trauma. There was no

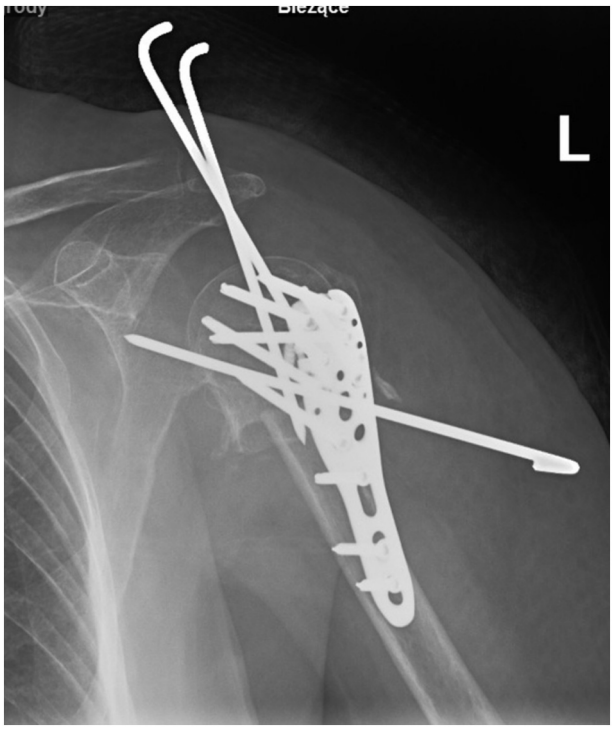

Fig. 4. Stabilization of the dislocation with Steinmann pins.

bulking of the transferred deltoid. The suture anchors on the radiograph were in place.

A proposed reason for the relapse was suture insufficiency. Since a third extensive surgery was considered risky, we performed closed reduction and stabilization of the joint with 3 Steinmann pins, to approximate the soft tissues until healing (Fig. 4). The patient was placed in an orthosis.

The pins were removed after 4 weeks. The radiograph after pin removal showed inferior subluxation of the humeral head. The arm was supported with orthosis for additional 4 weeks. Passive rehabilitation begun immediately after pin removal, and active rehabilitation started 8 weeks postoperatively.

At 15 months the patient is painless at rest, with pain after active movement with loading above 1 kg (VAS 4). Abduction is 80°, internal rotation to 90° and external rotation to 60°. Bone healing is complete, with no signs of the avascular head necrosis. The radiographs show inferior subluxation, with reduction of the joint in abduction (Fig. 5).

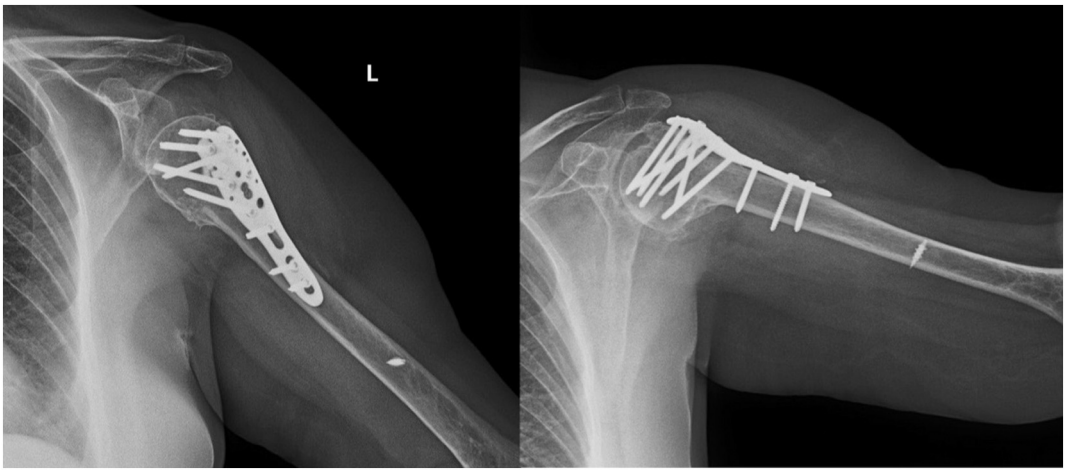

Fig. 5. Radiograph at 15 months postoperatively.

Discussion

Inferior shoulder dislocation as a result of humeral shortening osteotomy has not been previously reported. Transient inferior subluxation of the shoulder is a known complication after rotator cuff or humerus fracture surgery, due to a large intracapsular effusion or partial atony of the rotator cuff muscle [1].

It is known that bone shortening results in weakening of the surrounding muscles because their length-tension relationship is decreased [2]. The extent of weakening is related to the length of the resected fragment and to the osteotomy site.

The amount of bone that can be safely resected is controversial, but 4 to 5 cm in the humerus is considered safe. In this case, 6 cm only slightly exceeded the safe margin [3].

The partial tear of the rotator cuff most likely contributed to the dislocation, but unfortunately it was irreparable. The inspection of the joint, although had to be done, weakened the joint capsule. In cases with soft tissue loss, all supporting tissues should be repaired whenever possible, including suture anchors if necessary.

The soft-tissue reconstructive surgery was aimed to reestablish the length-tension relationship of the deltoid muscle, and provide additional soft-tissue support for the joint. A „wait and see" approach may have been reasonable if it were only a subluxation. A revision with bone lengthening over a structural graft was dismissed because the bone would not support another plate exchange, and healing would be further compromised.

The postoperative dislocation after muscle transfer was probably caused by failure of the soft tissue repair. Although the bone anchors on the radiograph were in place, the sutures most likely failed. Multiple anchors should be used in similar cases.

The stabilization of the shoulder joint with Steinmann pins was a salvage procedure that proved to be reliable. If such a soft tissue reconstruction needs to be performed again, we recommend immediate provisional stabilization to protect the repair.

Since the soft tissue repair failed and in the end the reduction was maintained with pins, it may have been reasonable to first stabilize the joint with pins and delay soft tissue reconstruction if the dislocation relapsed after removal of the pins. However, we believe that without the transfer the deltoid would have probably not achieved appropriate tension.

The end result, considering the circumstances, we consider satisfactory, although the clinical status may deteriorate due to arthritis.

References

[1] I.A. Kahlon, Transitory inferior dislocation of shoulder in a child after humerus fracture, J. Coll. Physicians Surg. Pak. 24 (6) (2014) 444–445.
[2] Y. Chang, F. Su, H. Wu, K. An, Optimum length of muscle contraction, Clin. Biomech. 14 (1999) 537–542.
[3] K. Cleveland, Delayed union and nonunion of fractures, Canale ST Campbell's Operative Orthopaedics 12th Ed Mosby, 2013, pp. 2901–3106.