Case Report

Anterior Elbow Subluxation After Radial Head Arthroplasty for Fracture Dislocation of the Elbow

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ABSTRACT

We describe a case of elbow dislocation with Hotchkiss type III radial head fracture and Regan-Morrey type II coronoid process fracture, which was treated with radial head replacement. It was complicated with oversizing of prosthesis, resulting in elbow subluxation. It was treated with radial shaft shortening osteotomy. The clinical result was satisfactory.

中文摘要

本文報告1病例合併Hotchkiss III型橈骨頭骨折和Regan-Morrey II型冠狀突骨折的肘關節脱位病例，並進行了橈骨頭假體置換手術治療。由於假體尺寸過大導致了肘關節的前方半脫位以及肘內翻，該患者之後接受了橈骨幹短截骨的補救手術，手術獲得成功，臨床效果滿意。

Introduction

A 69-year-old lady sustained a fall and landed on her right elbow in August 2001. She complained of right elbow pain and swelling. Clinically, her right elbow was swollen and deformed, with an abrasion wound at the medial side of elbow. Radiographs showed posterior dislocation of her right elbow and radial head fracture (Figure 1). Radiographs of both wrists showed bilateral positive ulnar variance. Closed reduction was performed under sedation, and a back slab was applied. In order to achieve a stable and good reduction of the elbow fracture dislocation, we proceeded to repair all the disrupted osseo-articular structures and torn ligaments in the theatre. The radial head was exposed through the Kocher approach. Intra-operatively, the radial head fracture was extremely comminuted and the bone was too osteoporotic. We decided to remove the radial head fragments and replaced it with a radial head prosthesis. To determine the size of the implant, all retrieved fractured fragments of the radial head were reassembled. The prosthesis (SOLAR radial head endoprosthesis, Stryker, MI, USA: small 11-mm size) was then inserted and cemented in the correct position. The type II coronoid fracture was fixed with intraosseous suture. Intra-operative examination under anaesthesia showed full elbow range of motion in all directions. There was persistent mild valgus instability throughout. No frank dislocation was noted. Post-operatively, the elbow was immobilised in an elbow brace in 90-degree flexion and neutral forearm rotation. However, the patient complained of severe elbow pain, which was not controlled with analgesics. Radiographs of the elbow showed lengthening of the radius after insertion of the radial head prosthesis with anterior subluxation and varus deformity of the elbow (Figure 2).

In view of the difficulty in revising a cemented prosthesis with osteoporosis, radial shaft shortening osteotomy was performed 3 days after the initial operation. Intra-operatively, we first transfixed the distal radioulnar joint with a K-wire to prevent its disruption. Shortening osteotomy of the radial shaft was performed through the Henry approach under radiological control to confirm the congruence of the radio-humeral joint. The osteotomy was stabilised with a 3.5-mm Albeitgemeinshaft fur Osteosynthesenfragen (AO) dynamic compression plate. The K-wire at distal radioulnar joint was then removed. Post-operatively, she was allowed to mobilise her right elbow in flexion-extension arc with a hinged elbow brace. The forearm was kept in supinated position to protect the medial collateral ligament. The elbow brace was taken off at 6 weeks after the operation. Four years after the operation, the patient reported no pain at her right elbow. Clinically, there was no elbow instability. The flexion-extension range of motion was 30–110 degrees. The supination was full, and the pronation was 40
degrees. Latest radiographs showed healing of the osteotomy site, and the right elbow joint was congruent.

**Discussion**

Fracture dislocation of the elbow in adults usually requires surgical treatment because most fracture dislocations are unstable. Elbow dislocation, radial head fracture, and coronoid process fracture are known to be the “terrible triad”, which is highly unstable. Restoration of bony integrity by reduction and fixation of the fracture and ligamentous repair are the choices of treatment. However, in patients with Hotchkiss type III radial head fracture and osteoporotic bone, like our patient, we do expect some difficulties. Radial head replacement may be chosen to maintain the stability of the radial column.

![Figure 1. Fracture dislocation of right elbow.](image1)

![Figure 2. Anterior subluxation and varus alignment of right elbow after radial head replacement.](image2)
For assessing the size of the radial head, the classic teaching was to put all the fractured fragments together to reconstitute the radial head. If the optimal match is not available, the next larger size implant is used.1

The concomitant injury of collateral ligaments will easily cause an error in seating the radial head prosthesis. Radial column lengthening may result in anterior subluxation in lateral view and varus malalignment. To minimise the error, we should use a trial prosthesis intra-operatively with radiological screening. The radiohumeral joint should be congruent. In addition, the radial head prosthesis should articulate at the same height as the radial notch of the ulna.2 The use of modular system or non-cemented prosthesis could be another option.

In our patient, the removal of the well-fixed cemented prosthesis was expected to be problematic, especially in the osteoporotic bone. In order to reduce the elbow joint, radial shortening is an alternative (Figure 3). K-wire was used to immobilise the distal radioulnar joint before the radial shortening osteotomy. This will prevent the migration of ulnar head distally during the shortening osteotomy of radius, which can ensure the correct length of shortening.

In summary, the diameter, height, and congruency of the radial head prosthesis should be carefully evaluated intra-operatively under fluoroscopy after the insertion of trial implant, especially in fracture dislocation of elbow. Radial shortening osteotomy is an effective treatment for the lengthening of radial column after insertion of the radial head prosthesis.

References