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From radial head to radiocapitellar to total elbow replacement: A case report

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ABSTRACT

INTRODUCTION: Radiocapitellar arthroplasty represents a possible treatment option for isolated osteoarthritis of the radial column. We report the first case of early failure of this procedure.
PRESENTATION OF CASE: We present the case of a 41-year old male who sustained a terrible triad injury to his right elbow and subsequently underwent radial head arthroplasty. Due to overstuffing of the radial head prosthesis, capitellar erosion occurred and radiocapitellar arthroplasty was thus performed. Only one year later, conversion of the radiocapitellar replacement to total elbow arthroplasty was required as a result of progressive ulnohumeral osteoarthritis.
DISCUSSION: According to the currently limited clinical data, radiocapitellar arthroplasty provides satisfactory results. However, biomechanical analysis shows that available prostheses do not sufficiently reproduce the radiocapitellar anatomy. The design of the prosthesis might thus have contributed to the rapid progression of ulnohumeral erosion following radiocapitellar arthroplasty although the poor outcome may also be attributed to the trauma itself along with the inadequate initial treatment.
CONCLUSIONS: The indication for radiocapitellar arthroplasty warrants careful consideration given the results of biomechanical analysis and the early failure due to progressive ulnohumeral erosion seen in the present case.

1. Introduction

Unicompartmental elbow arthroplasty represents a potential treatment option for posttraumatic osteoarthritis of the radial column and for acute fractures – especially of the radial head – not amenable to open reduction and internal fixation (ORIF). Isolated radial head arthroplasty offers promising mid- to long-term results [1,2], but little is known about the outcome of radiocapitellar replacement. While the limited amount of clinical data indicates good short-term results [3–6], we describe – to our knowledge – the first case of early failure of radiocapitellar arthroplasty. Thereby, we would like to raise awareness for this possible complication.

2. Presentation of case

A 41-year old, male patient fell from a ladder on the outstretched and pronated right arm with his wrist in dorsiflexion. He immediately felt severe pain in his right elbow and was taken to a nearby hospital. Plain radiography and a subsequently performed computer tomography (CT) scan revealed a terrible triad injury with posterior dislocation of the elbow joint, a severely comminuted radial head fracture and a coronoid tip fracture, type I according to Regan and Morrey [7] (Fig. 1). As a result, the patient had to undergo surgery for replacement of the radial head because ORIF was not feasible. Additionally, refixation of the coronoid tip along with the ventral capsule was performed using suture anchors.

10 months later, the patient was referred to another surgeon (BH) due to persisting painfully restricted range of motion of the right elbow joint. Flexion was limited to 100° and an extension deficit of 30° was present. Moreover, the patient reported ulnar nerve paresthesia. Plain radiography and a CT scan revealed overstuffing of the radial head arthroplasty which led to erosion of the capitellar cartilage (Fig. 2). Hence, revision surgery was performed

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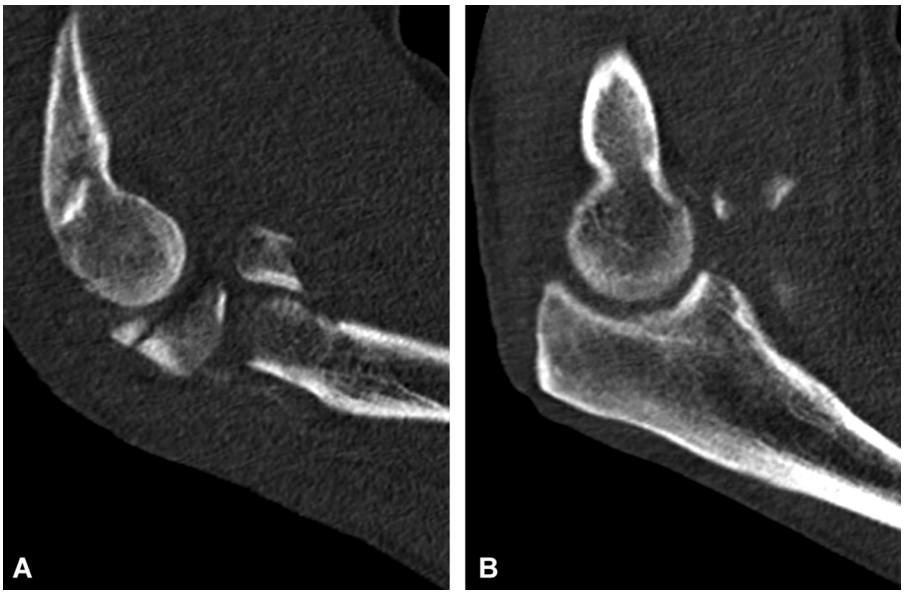

Fig. 1. CT scan following closed reduction. A: Sagittal view through the radiocapitellar joint revealing a comminuted, displaced radial head fracture. B: sagittal view through the ulnohumeral joint showing a coronoid tip fracture, type I according to Regan and Morrey [7].

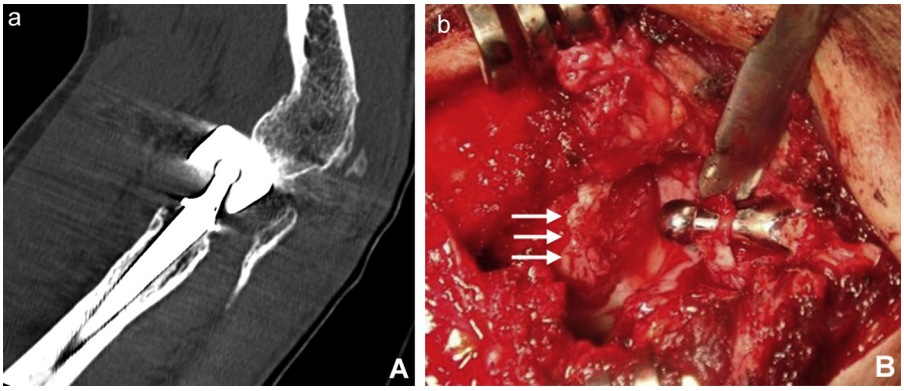

Fig. 2. Overstuffing of radial head replacement. A: CT scan in sagittal view 10 months postoperatively revealing overstuffing with capitellar erosion. B: intraoperative view through a lateral Kocher approach. The head of the bipolar prosthesis has been removed to show the damage of the capitellar cartilage (arrows).

with open arthrolysis, replacement of the radial head prosthesis and anterior transposition of the ulnar nerve. Pronounced medial instability was observed intraoperatively and therefore a hinged external fixator was used for six weeks. Nonetheless, medial instability persisted and ulnar collateral ligament reconstruction with a gracilis tendon autograft had to be performed five months later.

Initially, the patient's symptoms were greatly alleviated following revision radial head arthroplasty. However, progressive

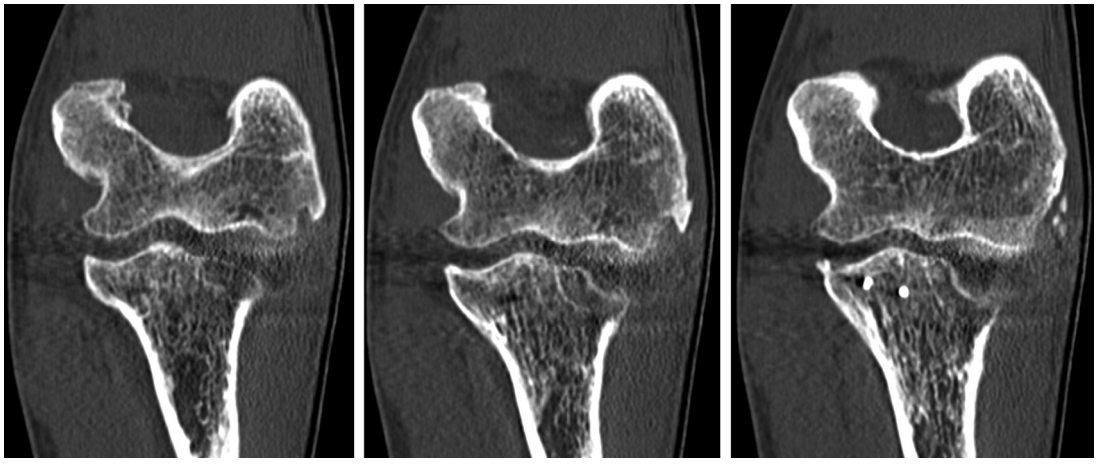

Fig. 3. Preoperative CT scan prior to radiocapitellar arthroplasty. Congruent ulnohumeral joint space without signs of significant osteoarthritis.