CASE REPORT

Medial displacement of the fragments following fracture of the radial head associated with a posterior elbow dislocation
Report of two cases

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Introduction

Marginal fracture of the radial head with displacement of the fragments is relatively common, especially associated with a concomitant posterior elbow dislocation. The separated fragments are usually displaced forwards and outwards, into the lateral part of the elbow or proximally in the elbow joint. Ulnar displacement of the separated fragments has, on the other hands, been described in very few cases, and in all of them the treatment consisted in the excision of the entire radial head. We report two cases of radial head fracture associated with elbow dislocation, with ulnar displacement of the fracture fragments. In one of our cases, open reduction and internal fixation of the head were performed.

Case 1

A 60-year-old woman injured her left elbow in a fall on her outstretched arm. Severe pain at the left elbow, with marked limitation of the range of motion, was present. The patient was initially visited in another hospital and, after clinical and radiographic examinations, a diagnosis of elbow dislocation with radial head fracture, Mason-Johnston type 4, was made. The dislocation was reduced, and the patient was immobilized in a plaster cast and referred to our institution for the fracture treatment. At physical examination the elbow was swollen and painful, with a large ecchymosis on the volar side of the elbow. The X-ray examination (Fig. 1) showed a fracture of the neck of the radius with ulnar displacement of the radial head, whose upper articular surface was directed upwards and laterally. The patient was operated on, and the radial head was excised through a medial incision. It was lying in the belly of the flexor digitorum profundus muscle. A track was found connecting the radial head through the fibers of the flexor digitorum profundus to a hole opened in the anterior part of the capsule of the elbow joint. The elbow was then immobilized in a plaster cast for 2 weeks after which active and passive exercises were started. At follow-up, 18 months later, the patient reported rear episodes of instability during housework. Limitations of 20° of extension, 15° of supination and 20° of pronation were present and the Functional Rating Index (FRI) was
At X-ray examination, para-articular calcio-ossifications were observed, especially on the anterior side of the joint.

Case 2

A 56-year-old man fractured his left elbow by falling down on his outstretched left hand in a motorcycle accident. When we visited him there was tenderness and swelling over the lateral and medial sides of the joint, and the joint range of motion was painful and limited. An ecchymosis was present over the anterior and medial sides of the joint. At X-ray examination was observed a posterolateral dislocation of the elbow with a Mason-Johnston type 4 radial head comminuted fracture. The elbow dislocation was immediately reduced. The X-ray made after reduction showed in addition a radial head fragment displaced medially to the proximal epiphysis of the ulna (Fig. 2a and b). The patient was operated on, and the elbow joint was approached from the lateral side. The radial head was comminuted and detached from the neck. One-fourth of the circumference was lost. We tested the elbow joint stability, and it appeared very unstable. We then approached the medial collateral ligament from the medial side and found it completely detached. We reattached the medial collateral ligament to its insertion with reabsorbable sutures. From the same incision, we located the medially displaced fragment of the radial head lying in the belly of the flexor digitorum profundus muscle. A tract was found connecting the fragment to the elbow joint. The fragment was then taken and fixated back to the rest of the head with a Herbert screw, and the head of the radius was reduced back on the neck and synthesized with a plate and screws for small fragments (Fig. 3a and b). The elbow was immobilized in a plaster cast for two weeks, and then active and passive exercises were started. After 9 months, limitations of the last 20° of flexion and extension and 50° of prono-supination were observed. The patient was completely pain-free, even during heavy-duty activities and his Functional Rating Index measured 84. Evidence of calcio-ossification consisting of small flakes on the anterolateral part of the joint was observed on the X-rays (Fig. 4a and b). The plate and screws were then removed. At follow-up 15 months later, the patient had recovered 20° of the 50° lost in prono-supination and he reported that he was very pleased with the results of the treatment with the FRI of 87.

Discussion

Comminuted fractures of the radial head are often observed in complicated cases of radial head fracture, sometimes in association with elbow dislocation. In the great majority of the cases, the resulting displacement of the fragments is forward and outward. Milch described three cases with proximal displacement of the radial head fragments to the joint level or above. Medial displacement of the fragments has been described even more rarely. Watson-Jones described two cases, one of them with ulnar nerve palsy. El Ghawabi reported three other cases suggesting two different types of injury, without and with elbow dislocation. In the first instance, the whole head is displaced medially, while, in the case with posterior elbow dislocation, the radial head is damaged by the severity of the trauma and usually divided into many fragments, with some of them dislocated to the ulnar side. Six of the eight patients reported by Eid, who had comminuted radial head fracture with medial displacement of the fragments, also presented posterior dislocation of the elbow, and two of them had ulnar palsy, probably due to a traction during the
elbow trauma. Both cases reported by us with posterior elbow dislocation associated with the radial head fracture, had good result (FRI ranging from 80 to 94). In one case the whole head was dislocated medially and, in contrast with El Ghawabi’s theory, it was not divided into many comminuted fragments. We did not observe any ulnar nerve palsy.

Instability of the elbow joint is usually present in severe fractures of the elbow associated with elbow dislocation, even if Broberg and Morrey did not report any instability in any of their patients. Eid reported instability of the elbow tested in all the patients under general anesthesia; the medial side of the elbow was then explored in all his cases, but the medial collateral ligament was torn in only two cases. We tested the elbow instability in our patients under general anesthesia after reducing the elbow dislocation, and found only one elbow that was loose. In this case, we inspected the medial collateral ligament through the medial incision, and reattached the torn collateral ligament to its humeral insertion. All previous authors treated radial head fracture with the excision of the whole head. More recently, some Authors had advocated to preserve the radial head by internal fixation using mini plates and mini screws, even if the fracture is displaced and comminuted. In one of our cases, the head was reconstructed together with the medial collateral ligament. We took the fragment medially displaced through the medial incision and fixed it to the radius with a plate and screws for small fragments. The fracture was tested and considered very stable, so the patient could start to move his elbow after two weeks. As reported by other authors, in this type of fracture the articular range of motion is usually limited at follow-up in most of the cases. We think that the severity of the lesions of the elbow joint, together with the elbow dislocation and the subsequent post-traumatic ossification, are responsible for these poor results. We observed a limitation of the range of motion of the elbow in both of our patients, one treated with radial head excision and one in whom the radial head had been reconstructed. We think that in this latter patient part of the limitation of range of motion was caused by the hardware used for the synthesis. In fact, after the plate and screws had been removed, the prono-supination clearly improved following 2 weeks of physical therapy, but it was still limited by 30°. This patient showed,
however, a much better stability of the elbow and was completely pain-free. In contrast, the patient who had her radial head removed reported pain together with rare episodes of valgus instability, especially during heavy housework. We think that, when possible, reconstruction of the radial head is indicated for the instability of the elbow, even though it will not prevent limitation of the range of motion due to post-traumatic para-articular calcio-ossification.

Figure 3  (a) The fragment was synthesized back to the rest of the head with a Herbert screw. (b) The head was then fixed to the neck of the radius with a plate and screws for small fragment.

Figure 4  Evidence of calcio-ossifications is present on anteroposterior (a) and lateral (b) X-rays of the elbow at follow-up.
References