Elbow luxation associated with external condyle and radial head fracture
Case report and literature review

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Received on October 21st, 2016; accepted after evaluation on February 14th, 2017 • PATRICIA C. CURBELO NOVA, MD • moipata@hotmail.com

Abstract
We present the atypical case of elbow complex dislocation, in an adult patient, associated with radial head and lateral humeral condyle fracture. We carried out dislocation closed reduction and later surgical treatment with open reduction and internal fixation in the lateral condyle fracture. We got a stable elbow which, after rehabilitation, achieved good mobility, and the patient soon retook working activities.

Key words: Elbow dislocation; complex dislocation; fracture.
Key words: IV

Luxación de codo asociada a fractura de cóndilo externo y cabeza del radio. Presentación de un caso y revisión bibliográfica

Resumen
Se presenta el caso atípico de una luxación compleja de codo, en un adulto, asociada a fractura de la cabeza del radio y de cóndilo humeral externo. Se efectuó una reducción cerrada de la luxación y el posterior tratamiento quirúrgico con reducción abierta y fijación interna de la fractura de cóndilo externo. Se obtuvo un codo estable que, luego de la rehabilitación, logró una buena movilidad y el paciente se reintegró al trabajo rápidamente.

Palabras clave: Luxación de codo; luxación compleja; fractura.
Nivel de Evidencia: IV

Introduction

Elbow stability can be boiled down to the Morrey's tripod stability theory, where the main stabilizing elements are the humeroulnar joint, the elbow lateral collateral ligament and the elbow medial collateral ligament, and the secondary stabilizers are the radial head, the capsule, and the periarticular muscles.[1]

Elbow dislocation accounts for 11-28% of the elbow injuries, and they are classified as pure or complex as they are associated with fracture or not. Complex dislocations stand for 20% of these injures, and they are most frequently associated with fracture in the coronoid process, the radial head, the olecranon process, and the lateral condyle. There are reports on diverse mechanisms that cause elbow dislocation, such as hyperextension, direct impact,

Conflict of interests: The authors have reported none.

axial varus-supination-compression, and axial valgus-supination-compression; the latter is the most frequent one of all.[2]

Radial head fractures are the most frequent ones in the elbow. They are caused by axial mechanisms with the upper limb in extension and the forearm in pronation (posture in which pressure is more strongly transmitted through the radius).

Mason's classification divides radial head fractures into: type I fractures, non-displaced or <2mm-displaced fractures; type II fractures, displaced fractures; type III fractures, comminute fractures; and type IV fractures, fractures associated with dislocation.[3]

Lateral condyle fractures are rare in adults and are caused by shear forces on the lateral humeral condyle which come from the radius. They are classified according to the Brian and Morrey's system: type I or Hahn Steinthal fracture, which are complete fractures of the lateral humeral condyle with or without a small extension to the trochlea; type II or Kochez-Lorenz fracture, which are osteochondral fractures with a small subchondral component; type III or Broberg-Morrey fracture, which are comminute fractures; and McKee described a type IV where the coronal fracture of the condyle includes most of the trochlea. For the treatment of displaced fractures the preferred option is open reduction and internal fixation with AP countersunk double-threaded screws under the articular cartilage or PA such screws.[4]

We present a patient who suffered an elbow dislocation associated with fracture of the radial head and lateral humeral condyle. Moreover, we conducted a bibliographic research for this type of injuries.

Case

Forty-five-year old female, right handed, maid, who suffers a fall from her own height on her left hand with extended elbow, At physical examination at the ER, what stands out is a painful left elbow with deformity and functional impairment, without skin injury, with normal pulse and distal neurological examination in such limb. X-rays show a complex lateral dislocation in her left elbow associated with the displaced fracture of her lateral condyle, and a radial head fracture (Figure 1). She is subject to closed dislocation reduction and is put in a long arm cast in neutral position; reduction is checked with new X-rays (Figure 2). CT scan shows a coronal-line lateral condyle fracture with back comminution, i.e. a type III or Broberg-Morrey fracture in the Brian and Morrey's classification; and a radial head fracture with a unique minimally displaced fragment of the Mason IV type (Figure 3).

The patient is subject to surgery 48 hours after the injury. She is given general anesthesia and receives a lateral Kocher-type elbow surgical approach. The fracture of the lateral condyle is reduced with bone clamps, and osteosynthesis with

Figure 1. Initial X-rays.

Figure 2. X-rays after closed reduction.

Figure 3. Sagittal and coronal sections, and CT scan reconstruction before the surgery.

two 3-mm flathead compression cannulated screws is carried out, both screws in AP and ascendant position and normal to the fracture line. The radial head fracture is not operated on. After osteosynthesis, the stress varus-valgus tests show varus instability; therefore, an epicondyle fracture with a portion of the lateral collateral ligament attached is fixed with a small-fragments screw with washer. The surgical wound is closed by planes and the patient is put in a neutral-elbow long arm cast. The immediately postoperative X-rays show the proper reduction of the fractures (Figure 4). The patient does well and she is discharged from hospital 48 hours after the surgery. She attends follow-up one week afterwards and, then, three weeks after the surgery, when stitches are taken out, the splint is removed and rehabilitation starts verifying elbow proper stability. New follow-up X-rays are taken and outcomes are considered to be good.

Eight weeks later, the patient shows a stable elbow with 120º-flexion and -20º-extension, and 80º-prono-supination. Twelve weeks later, she retakes working activities with no limitations to carry out the tasks she is allocated.

ISSN 1852-7434 (online) • ISSN 1515-1786 (printed)

Figure 4. Postoperative X-rays.

Discussion

We carried out a bibliographic research at databases MEDLINE, LILACS and Embase using the following key words: dislocation, elbow, condyle and fracture.

We found few publications about elbow dislocations associated with lateral condyle fractures in adults,[5,7] although there are diverse publications about lateral condyle fractures associated with elbow dislocation in children.[8-10]

Abdelhakim[5] carried out a retrospective study in which they analyze 179 humeral lateral condyle fractures in adults; only five of them were associated with dislocation. All lateral fractures were treated with open reduction and internal fixation, they did not carry out ligament repair in any case, and functional and patients' satisfaction outcomes were good.

We found only one case report on PL elbow complex dislocation associated with lateral condyle and radial head fracture, in an adult patient, published in 2007, in Spain. Lozano Moreno[2] published the case of 62-year old patient who, upon undergoing a fall from his own height, suffered an elbow complex dislocation associated with radial head comminute fracture and lateral condyle fracture. Dislocation was subject to closed reduction and, later on, they carried out open reduction and internal fixation with a cannulated screw in the lateral condyle plus radial head removal. Ligaments were not repaired. Six weeks after the injury, the patient had a stable elbow and good ROM.

The patient we present in this case showed a complex elbow dislocation associated with radial head and lateral condyle fracture. Given the type of injury, we infer that the mechanism of injury was one of axial valgus-supination-compression, where the impact of the radial head on the humeral lateral condyle caused a vertical fracture in the lateral condyle. With respect to treatment, in most published cases they recommend closed dislocation reduction at the emergency time [2,5-7,11,12] Since ours was a non-displaced radial head fracture, the patient was not subject to surgical treatment. The lateral condyle fracture was reduced using a Kocher approach. For this procedure there are reports on lateral column, posterior universal and Kocher approaches. The implants we used were flathead compression cannulated screws, which produce closure and compression at the level of the fracture for later counterskin without interposition in the humero-radial joint space. Due to the varus-instability our patient showed we reduced a lateral epicondyle fragment with a portion of the lateral collateral ligament attached; we fixed it using a screw with washer.

The patient did very well, since she has recovered mobility almost completely in her affected elbow, and she soon retook working activities.

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ISSN 1852-7434 (online) • ISSN 1515-1786 (printed)