

BILATERAL TERRIBLE TRIAD INJURY OF THE ELBOW – A CASE REPORT

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**CASE
REPORT**

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Abstract

Considered to be a rare and very disabling condition, bilateral terrible triad of the elbow is a fracture-dislocation, which consists in a fracture of the radial head and also of the coronoid process of the ulna, all of this associated with a posterior displacement of the elbow and high instability. It was named "terrible triad" because of the poor outcome of bone healing and range of motion, both medium and long term. What we present is a special case, first because it was not a unilateral terrible triad injury but bilateral, and because the treatment was different for each elbow, which was interesting for comparing the outcome. Although both radial head fractures were comminuted, with different treatment options, for one of them open reduction and internal fixation was performed, while for the other one our option was replacement of radial head with a prosthesis. For both elbows we obtained good functional outcome at 1-year follow up.

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Introduction

The terrible triad was first described by Hotchkiss [1] as “a fracture of the radial head associated with the fracture of the coronoid process of the ulna and posterior dislocation of the elbow”. This type of injury usually occurs from falling on the extended arm, in supination position of the forearm and exercising a valgus stress on the elbow [2]. It is commonly met in young patients; men being affected more often.

Most cases must be managed surgically because it is mandatory to reconstruct the ligamentous structures in order to obtain the stability of the joint, which permits early

motion, thus a series of complications can be avoided, (and most important of them is) such as rigidity of the elbow, (and restraint range of movement, particularly full extension) allowing for full recovery. ?

There is a consensus among the orthopaedic surgeons that this injury represents a challenge because of its high instability of the elbow, which prones to joint stiffness and secondary arthrosis, leading to an unfavorable prognosis [3]. Furthermore, the reduced amount of studies published in literature, and not yet a known protocol, makes it harder to choose the proper technique in solving this type of pathology. Therefore, a better knowledge of the elbow

biomechanics and anatomy, with a good stability and early motion is necessary when expecting a good outcome.

Case presentation

A 39 years old male was brought to the emergency ward after sustaining a high energy trauma during downhill mountain-biking, a fall on the outstretched arms while going downhill. Plain radiographs taken upon admission (Figure 1) showed bilateral dislocation of both elbows, with radial head and coronoid process associated fractures.



Figure 1 – bilateral dislocation with associated radial head and coronoid fractures

A close reduction was tented followed by immobilization in cast, but due to high instability of the lesion it could not be maintained.

A computer tomography scan of both elbows with three dimensional reconstruction showed in the right elbow a Mason type III fracture, coronoid fracture Regan Morrey type II and posterior displacement of the elbow (figure 2).

In the left elbow (figure 3) a posterior luxation of the elbow associated with type IV Mason fracture (as modified by Hotchkiss and Morrey) and a type I Regan Morrey fracture of the coronoid process was present.



Figure 2 – 3D computed tomography reconstruction of the right elbow



Figure 3 - 3D computed tomography reconstruction of the left elbow

During the preoperative planning we also did an analysis of the literature. It revealed, as expected, that whenever possible an open reduction and fixation of the radial head is best, but in highly comminuted fractures, as is present in the left elbow, replacement of the radial head is better, as its excision associated, as in this case specifically, with a type I coronoid fracture that is impossible to repair due to the small size of the fragment and difficult approach, will leave a high degree of instability. Thus, the decision was made to replace the radial head with a uniblock metal prosthesis (figure 4) through a lateral approach to the elbow. Surgery was performed in the 5th day after the accident, both elbows at the same surgical time.



Figure 4 – postoperative x-rays of the left elbow

For the right elbow, the decision was to do an open reduction and fixation with plate and screws using a combined lateral and posterior approach. We excised all the fragments during the surgery and reconstructed the radial head on the table (figure 5). The space created allowed us to explore the coronoid fragment and reduce it, temporary stabilizing it with K-wires.



Figure 5 – excision of radial head and prepare of the reconstruction on the surgical table.

The small fragments were attached to the bigger fragment with 2 screws, afterwards, the radial head was reattached to the diaphysis with a “T” plate and screws. Due to the size of the coronoid fragment, fixation was finally done using a screw and a K-wire (figure 6). We evaluated the movements in both elbows during surgery under fluoroscopy, with full ROM achieved in both arms. We dressed the wound and immobilized the arm in splints.



Figure 6 – Postop x-rays of the right elbow

Postoperative care consisted in passive mobilization of both elbows within pain limit every 2 days, at dressing change. At 10 days we changed from splint to a hinged elbow orthosis, allowing start of flexion-extension with an incremental increase in motion of 15 degrees every week, but blocking the rotational movements for the first 4 weeks. Physiotherapy and kineto was started at 14 days, with recommendation of 12 months of continual rehabilitation in a specialized center. Also, Indomethacin was prescribed for 3 weeks in order to prevent heterotopic ossifications.

At 6 months post-op, control x-rays are shown in figures 7 and 8.



Figure 7 – control x rays of the left elbow at 6 months



Figure 8 – control x-rays of left elbow at 6 months

ROM is shown in figure 9. There was a contracture in flexion of about 25° in the right elbow and 20° in the left elbow. Supination was 45°, while pronation was up to 80° in the right elbow. The left elbow had a pronation of 80°, with supination of 50°. Flexion was of

110° in the right elbow and 120° in the left elbow.



Figure 9 – extension with pronation and supination at 6 months

At the 1 year follow up, full fracture healing of the right elbow was noted on the radiographs (figure 10) and no complications of the left elbow were noted from the radiographic point of view. The k-wire and screw attaching the coronoid fragment were removed at 13 months.



Figure 10 – 1-year radiographic control of the right elbow

Still, full ROM was not achieved. In the right elbow there was a flexion contracture of 15°, flexion of 120°, pronation 90° and supination of 70°. The left elbow had somewhat superior outcome, still with a flexion contracture of 10°, flexion was 140°, pronation was at 90° and supination was at 80° (Figure 11).



Figure 11 – ROM at 1-year follow-up.

Discussions

In terms of recovery, we consider that an early surgical management is to be preferred, not before a 3D CT of the region, in order to better assess and classify the fracture, in order to prepare for the surgical management of the fracture. An MRI of the area is useful in order to evaluate the soft tissue lesions, but we must always keep in mind that the lateral ligament and capsule are always torn, thus a suture or anchor should be at hand during surgery. Surgical team should be specialized in dealing with lesions of the area.

Apart from the surgical time and outcome, a very important part of the recovery in such patients is the compliance with the rehabilitation time and protocol. In our patient, he lost his patience after 5 months, which can be seen in the range of motion at the 6 months control and in the absence of loosening of the flexion contracture at the 1-year follow up. Still, return to sports and mountain-biking at 9 months made the difference in both physical and emotional state of the patient, returning to rehabilitation and exercising, thus increasing his outcomes. A full disclosure of the limitations in recovery of this kind of lesion, with emotional preparation of the patient is useful in assuring patient compliance with the recovery.

Conclusions

In spite of the severity of the impairment found in the terrible triad of the elbow and the particularity of being bilateral lesion, we managed to obtain elbow stability with good clinical results. The factors that led to greater clinical results were early surgery at 7 days after the injury, replacement of the head of the radius rather than repair, Indomethacin treatment for preventing heterotopical ossification and early started, but sustained for more than 8 months,

rehabilitation programme. Comparing the results of the different surgical solution in this case, we consider that all radial head fractures above Mason type III have a better and faster result with radial head replacement rather than osteosynthesis.

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