

Association of a dislocated elbow fracture and a distal radius fracture on an ipsilateral radial arteriovenous fistula: A case report

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Abstract

We present a rare case of a chronic hemodialysis patient with a right radial arteriovenous fistula who presented to the emergency department with a dislocated elbow fracture associating a posterolateral dislocation with a Regan and Morrey stage 2 fracture of the coronoid process. Combined with an ipsilateral fracture of the distal radius.

First, we osteosynthesized the distal radius with a locked plate and the ulna with a tier tube plate. Secondly, we performed a bloody reduction of the elbow using a double approach, with osteosynthesis of the coronoid process by retrograde screw fixation and repair of the radial collateral ligament.

Early rehabilitation starting on day 1 post-op, and resumption of hemodialysis sessions the day after the procedure.

Keywords: Elbow; Radius; Coronoid Process; Luxation; Arteriovenous fistula

1. Introduction

The association of elbow dislocation with distal radius fracture is rare. The cases that are already reported in this pattern involve those in the pediatric age group, those with a compound fracture, and a few cases of a combination of posterior elbow dislocation with ipsilateral distal radius fractures [1,2,3].

We present a case of a 67-year-old chronic hemodialysis patient with a right radial arteriovenous fistula admitted for a dislocated fracture of the right elbow associated with a fracture of the distal radius.

2. Case

A 67-year-old patient, right-handed, diabetic, diabetic retinopathy, chronic hemodialysis patient with a right-sided radial arteriovenous fistula, presented to the emergency department with right elbow pain and swelling associated with right wrist pain and functional impotence of the right upper limb following a fall onto the extended wrist.

Clinical examination revealed a traumatic posture of the upper limb, with edema and deformity of the elbow and wrist, with no downstream vasculo-nervous disorders.

Radiological examination of the right elbow revealed a dislocated elbow fracture with posterolateral dislocation and a stage 2 coronoid process fracture according to the Regan and Morrey classification.

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X-rays of the right wrist, face and profile, revealed a fracture of the radius and distal ulna, completely displaced posteriorly on an osteoporotic bone (Figure1).

Patient under general anaesthesia, without tourniquet. First, using an anterior Henry approach, we osteosynthesized the radius with a locked plate, then, using an approach centred on the ulnar crest, we osteosynthesized the ulnar head with a 1/3-tube plate.

In the 2nd stage, using a double medial and lateral approach to the elbow, we performed a bloody reduction of the elbow with repair of the radial collateral ligament using end-to-end sutures, followed by retrograde screw fixation of the coronoid process (Figure2).

Elbow stability testing was satisfactory at the end of the procedure.

Immobilization with a sling for a week was carried out for pain relief, self-education began on day 1 post-op and hemodialysis sessions resumed the day after the procedure.

At 45 days, the patient's clamping force was already 70% that of the contralateral side, and the elbow had a flexion of 110° with full extension, pronation and supination of 60° and 70° respectively (Figure 3).



Figure 1 Preoperative front X-ray of the right elbow shows posterolateral dislocation with stage 2 fracture of the coronoid process (A), and front and side X-ray of the right wrist shows extra-articular fracture of the distal radius and ulnar head (B). X-ray of both joints (C)

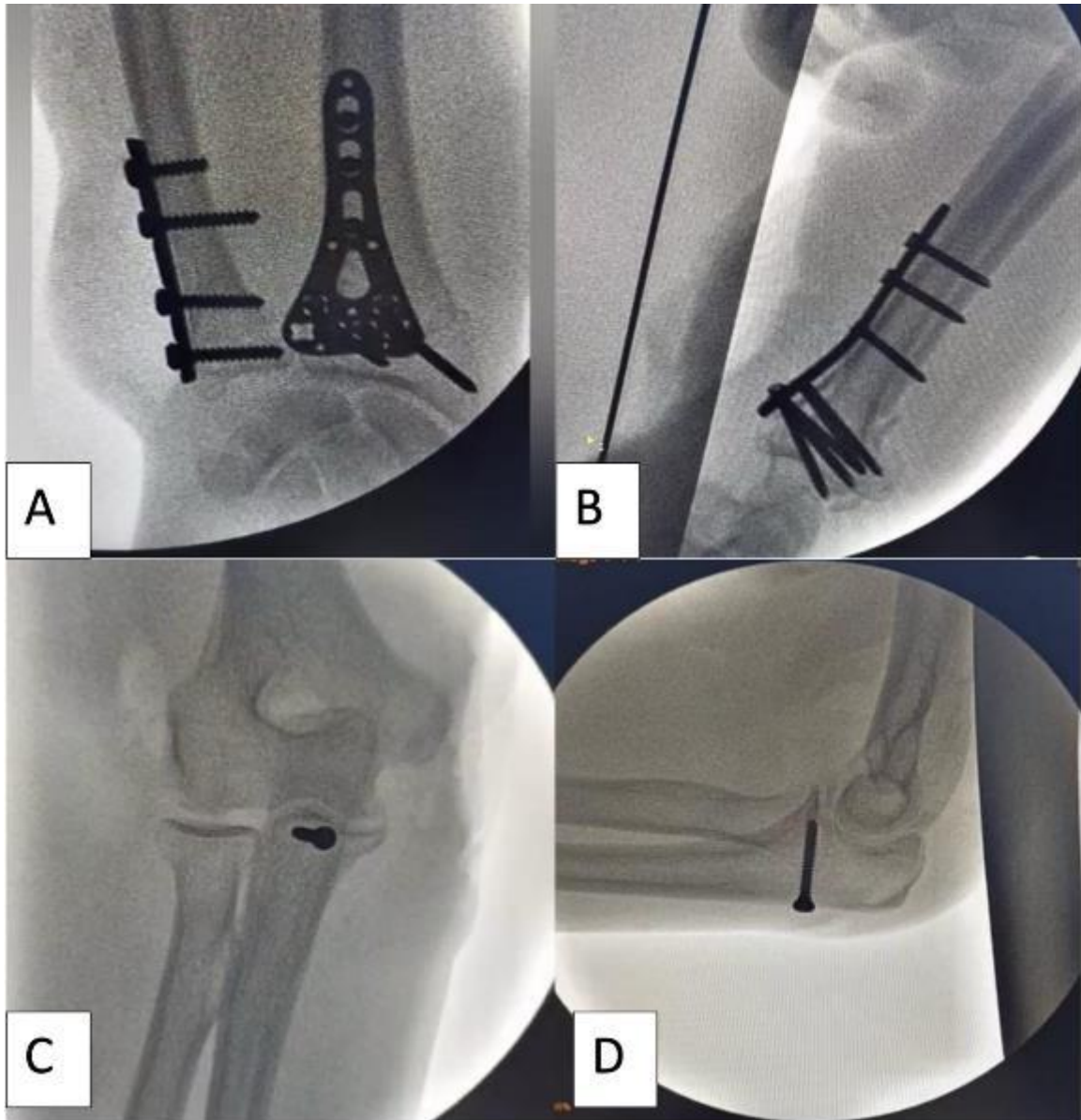


Figure 2 Postoperative control radiograph after osteosynthesis of the radius and ulna with plates and retrograde screw fixation(A)(B) of the coronoid process and reduction of the dislocation(C)(D)



Figure 3 Clinical image of the elbow at day 45 showing full elbow extension and 110° flexion

3. Discussion

Challenges found in this patient:

- A very rare lesion association, especially in a chronic osteoporotic hemodialysis patient (no similar case in the literature).
- Complete lesion assessment to stabilize the elbow
- The arteriovenous fistula is on the same side as the fracture
- The arteriovenous fistula is close to the approaches.
- Risk of arteriovenous fistula thrombosis.
- Early mobilization is required to avoid stiffness in osteoporotic patients, so a stable set-up is essential.

Henrik C. Bäcker et al showed that combined distal radius fracture and ipsilateral elbow dislocation is most commonly sustained by elderly patients over the mean age of 70 years with a low-energy mechanism [4].

Posterolateral elbow dislocation has previously been explained as occurring from a longitudinal compressive force along with valgus and external rotatory stress to the semiflexed elbow while falling onto an outstretched hand [5.]. In this case, the distal radius fracture was produced by a continuation of same impact on his distal forearm once his hand hit the ground with his entire body weight on the forearm and his hand deviating radially leading to compounding on the ulnar side [6].

In patients on dialysis, Poor bone quality and delayed bone healing due to amyloid deposition and renal osteodystrophy, when treating fractures of the distal radius, which is an unloaded bone, it's most important to obtain sufficient fixation to allow movement soon after surgery.

Surgical treatment of distal radial fractures on the shunt side is abandoned in many cases because of concerns over hemorrhaging and the fact that the vascular access point is located close to the radius, However, the radius can be safely

reached using the Henry approach [7]. In addition, Naito et al reported that no complications such as obturation of the arteriovenous shunt occurred during surgery for carpal tunnel syndrome involving a tourniquet [8].

In our case, hemostasis was achieved without tourniquets through the careful use of an electric scalpel, and open osteosynthesis was performed successfully.

The coronoid process, a static primary restraint, contributes to elbow stability in both antero-posterior and varus-valgus [9, 10]. It has been estimated that up to 15% of patients with elbow dislocation may present with associated coronoid process fracture. This association predisposes to recurrent instability [9]. Fractures of the coronoid process are classified into three types: type I is a shear fracture of a small fleck of bone; type II corresponds to fractures of 50% or less of the coronoid process height; and type III is a fracture of more than 50% of the height of the coronoid [10]. The prevalence of instability goes crescendo with the height of the coronoid that is involved [9, 10]. Two other static primary stabilizers are identified:

The medial and the lateral collateral ligaments [9]. The anterior bundle is the most important part of the medial collateral ligament; it resists valgus forces in all degrees of flexion [12, 9, 11]. The lateral collateral ligament is a restraint to varus forces and has a critical role in the overall elbow stability [12, 9, 11]. Even though considered as a static secondary stabilizer, the anterior capsule resists significantly the distraction and valgus-varus loads when the elbow is extended [12, 9]. Most acute elbow dislocations are accompanied by complete rupture of both medial and lateral collateral ligaments with extensive injury of the anterior capsule [14].

4. Conclusion

The interest in presenting this case lies in the rarity of this entity in the literature, as well as the challenges in its management in the presence of the arteriovenous fistula.

The radiographs of an elbow injury case should always include that of the wrist and vice versa.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare no conflicts of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

Authors' contributions

All authors contributed to the patient's care and to the drafting of the manuscript. All authors have read and approved the final version of the manuscript.

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