

# Galeazzi fracture associated with an ipsilateral fracture of ulna diaphysis and olecranon- A rare lesional association- About a case and review of literature

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## Abstract

**Introduction:** Tripolar lesions of the thoracic limb are rare. We report a rare a Galéazzi fracture associated with an ipsilateral fracture of ulna and olecranon in a 45-year-old patient. Surgical management has been delayed due to limited resources of the patient.

**Case presentation:** It was a 45-year-old man admitted in our emergency after a fallen on bicycle. He presented a fracture of olecranon, shaft bone fracture of radius and ulnar, and distal radio-ulnar disjunction. The assessment at 18 months has found a consolidation of fractures. The elbow and wrist regained joint range, but we noted a limitation of prono-supination related to radioulnar synostosis. This limitation had no impact on the professional and sporting activities of the patient.

**Conclusion:** Apart the difficulties to describe mechanism responsible of this complex lesion, the functional prognosis of the limb depends on a correct diagnosis and adequate management. At the last follow-up, the patient was satisfied with the result obtained. Longer term follow-up will allow us to determine the issue of this complex lesion in this patient. For the moment patient is not complained so we just wait and see.

**Keywords:** Galeazzi fracture, Distal radioulnar disjunction, Fractures, Forearm, Olecranon

## Introduction

The Galéazzi fracture associate a fracture of the radial shaft and a distal radioulnar disjunction. It accounts for 3-6% of adult forearm fractures [1]. Its association with a Montéggia fracture is rare but a dozen cases have been described in the literature [2]. The Galéazzi fracture associated with an ipsilateral ulna fracture and an olecranon fracture is even more rare and we have not found any reported cases. The fracture of Galéazzi occurs after a fall with reception on the palm of the hand forearm hyperpronation [3].

the association of the Galéazzi fracture with an ipsilateral fracture of the olecranon and the ulna raises questions about the mechanism and the management. If the gold standard of the fractures of the two forearm bones is an open reduction and internal fixation by screwed plate on the radius and the ulna, cases of osteosynthesis by intramedullar nailling of the radius and the ulna were also described with satisfactory results [4]. We report a rare case in a 45-year-old patient with a Galéazzi fracture associated with an ipsilateral fracture of the ulnar shaft and a fracture of the olecranon. We will discuss the lesional mechanism, the therapeutic possibilities and the evolution of the surgical treatment in this patient.

## Clinical observation

It was a 45-year-old patient admitted to the emergency department on 04 April 2017 for pain and functional impotence of the left thoracic limb following a closed trauma of elbow, forearm, and wrist. The patient would have fallen from his motorcycle with reception on the upper left limb. The examination had found a patient in upper limb trauma's attitude, a swelling of the elbow associated with a deformation of the middle 1/3 of the forearm. The palpation found a pain in the middle third of the forearm and in front of the olecranon. There was also wrist pain with a piano touch mobility of the ulnar head. There was no associated vasculo-nervous lesion. Examination of other members and other devices was normal. The patient received analgesic treatment and x-rays of the elbow, forearm and wrist were performed.

The radiological assessment concluded to olecranon fracture classified Morrey 2 (Figure 1)

associated with fracture of both forearm bones and distal radioulnar disjunction (Figure 2)

An osteosynthesis by screwed plate of the radius and the ulna, and by guying of the olecranon was indicated but the patient had a problem of financial means. The indication was therefore modified into an osteosynthesis by screwed plate of the radius associated with an intramedullar nailling of the ulna and guying of the olecranon. The patient was operated 7 days after his trauma. Under general anesthesia, the anterior approach of henry exposed the radial fracture, which was reduced and then fixed by an 8-hole DCP plate. The patient was reinstalled in lateral decubitus. We made a posterior median incision of elbow. The fracture of the olecranon was reduced and two 18/10 pins were put in place. An incision in front of ulna shaft fracture allowed to reduce the fracture of the ulnar diaphysis and lowered the two pins into the distal fragment of the ulna. Guying was made on olecranon fracture.

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**Figure 1:** fracture of the olecranon associated with a fracture of the two bones of the forearm.

Ulnar radio dislocation was reduced spontaneously after stabilization of diaphyseal radius and ulna fractures. All osteosynthesis was stable. An aspiration drain was put at the radial and olecranon approach. The different incisions were closed.

The radioulnar joint was stable in supination and pronation. We did not find necessary to perform a surgical procedure. A control X-ray was performed (Figure 3) and the patient began rehabilitation on the fourth post-operative day.

The patient was discharged from hospital on the seventh postoperative day and continued care. Control at the third month postoperative noted a consolidation of the olecranon fracture. The callus on radius and ulna fracture was not sufficient. The flexion of the elbow was 120° and 170° for the extension. the pronation and supination of forearm were respectively at 70° and 80°. The rehabilitation was continued to improve the range. In the sixth month the radius fracture also consolidated but the callus still insufficient at the ulnar focus. At 18 months postoperatively, the three fractures consolidated (Figure 4) but there was a radio-ulnar synostosis that had no impact on the function of the limb. Elbow flexion 140° and extension 175°, the pronation was 75° and 85° for the supination. Wrist flexion at 90° and extension at 80°. The clinical Mayo score was estimated at 90. The patient resumed his professional activities and was able to perform sports activities.

### Discussion

The Galéazzi fracture associated with a fracture of the ulnar diaphysis and olecranon is a rare lesion. Omer C and al [5] reported in 2015 an ipsilateral fracture of distal radius and olecranon in 56-year-old man. They confirmed the complexity of mechanism responsible of this



**Figure 3:** control radiography on the first postoperative day



**Figure 2:** 2 A: fracture of both forearm bones; 2 B: Distal radioulnar disjunction

association. The Galéazzi fracture usually occurs after a fall and reception on the palm of the hand forearm hyper pronation. His association with elbow dislocation has been described by several authors [6]. According to abalo et al [7], during the fall with reception on the palm of the hand, the transmitted energy would be in cause of the wrist injury, the fracture of radius and finally the dislocation of the elbow. In our case, the patient has not able to describe the exact circumstances of his fall, but we think that the occurrence of this tripolar lesion can only come from an indirect and combined mechanism.

The fall with reception on the palm of the hand would be responsible for the distal radio-ulnar disjunction and the fracture of the 2 forearm bones but would not explain the fracture of the olecranon. This fracture has been probably caused by a direct choc on olecranon or a reflection contraction of brachial triceps during the reception of the patient. The purpose of treatment of this lesions is to restore the member's function.

The gold standard for the treatment of both forearm bones is open reduction and internal fixation by screwed plate of the radius and ulna [8]. It allows correction and restitution of radial and ulnar curvatures and allows early rehabilitation. The association screwed plate of radius and racking of the ulna has been made by several authors [9,10]. Mikhele [9] et al. In their study about 27 cases obtained 75% of good result. Khemi [10] points out the risk of malunion and pseudarthrosis of the ulna due to insufficient stabilization, especially when the fracture sits at the distal 1/3 of the ulnar diaphysis.

This treatment seems to be a good alternative in the context of unavailability of plaques or when the patient has difficulties to pay his care. We performed osteosynthesis by screwed plate of radius and by racking of ulna in our patient precisely because of his inability to honor two plates. Another alternative is the racking of the two bones of the forearm. It was performed by abalo and al [11], as well as Gogoua and al [12] with respective 72% and 75% of satisfactory results. After the racking of two bones, an immobilization by brachio-palmar plaster



**Figure 4:** control x-ray at 18 months postoperatively. 4A: Elbow X-ray: Consolidated Olecranon Fracture 4B: radiography of the forearm

should be put in order to avoid some complications such as vicious callus and delayed consolidation. We used the pins used for the stabilization of the ulna to conduct the guying of the olecranon. The goal of the osteosynthesis of the olecranon fractures is to obtain a stable fixture in order to immediately begin the rehabilitation of the elbow. The guying when properly carried allowed to fill this specification for Mayo type 1 and 2 lesions. Type 3 lesions are characterized by their instabilities and require screwed plate osteosynthesis especially when the fracture is comminuted or when there was loss of bone [13].

In the latter situation, authors have proposed a contribution of iliac graft in order to restore the length of the olecranon and a bracing is performed associated with multiple pinning [12,13]. The fracture of the olecranon of our patient was a type 2. Guying had allowed us to have sufficient compression and to allow rehabilitation of the elbow from the fourth day post-operative. Once the fracture of both bones of the forearm stabilized, distal radioulnar dislocation was reduced spontaneously and was stable in pronation and supination. The management of radioulnar dislocation distal lesions of Galéazzi remains controversial [14]. Since posterior luxations of the ulnar head are often stable in supination and anterior dislocations in pronation, Adams [12,14] advocates a plaster immobilization of 4 to 6 weeks in one of the positions once the dislocation is reduced.

Giannoulis et al [15] recommends stabilizing by 2 Kirchner's pins in a neutral position when dislocation is reduced and stable. In case of instability after reduction, they suggest the approach of the joint in

order to repair the triangular fibro-cartilaginous complex followed by a plastered immobilization. We opted for additional immobilization in our patient and delayed the rehabilitation of the wrist after the fourth week. The follow-up at 18 months postoperatively indicated a consolidation of radial, olecranon, ulnar fractures, and radioulnar synostosis. Functional assessment was satisfactory with a Mayo score of 90. Radio-ulnar synostosis is a complication related to membrane damage at the approach of the radius and ulna, and may compromise pronosupination. It could explain the limitations of the pronosupination amplitudes in our patient. Since it did not have a significant impact on the activities of our patient and he was not plaintiff, a surgical abstention was decided.

### Conclusion

The management of a fracture of a Galéazzi fracture is generally not problematic apart from the controversy over the attitude towards distal radioulnar dislocation. Its association with a fracture of the ulna and olecranon changes the prognosis of the limb due to the tripolarization of the lesions. The therapeutic challenge in this case is to restore the wrist and elbow their different range of motion and forearm pronosupination movements. When the working conditions are limited, this specification is difficult to fill. The correct analysis of the lesions and the implementation of a rigorous protocol allowed us to obtain a satisfactory result, which could have been better if the care was taken earlier and the appropriate technical platform.

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