

Case report of Galeazzi like fracture associated with fracture of the scaphoid, Rolando fracture and avulsion of the inserting site of the extensor carpi ulnaris

Foad Lamnaouar ¹, Khalil Tabbak ¹, Mohamed Amine Kharroube ¹, Nekeshima Nicodeme ¹, Abdssamad Rajaallah ² and Mohamed Rafai M ²

¹ Resident at orthopedy and traumatology department P32 CHU IBN ROCHD CASABALNCA MOROCCO.

² Professor orthopedy and traumatology department P32 CHU IBN ROCHD CASABALNCA MOROCCO.

World Journal of Advanced Research and Reviews, 2023, 20(02), 701-705

Publication history: Received on 27 September 2023; revised on 08 November 2023; accepted on 11 November 2023

Article DOI: <https://doi.org/10.30574/wjarr.2023.20.2.2274>

Abstract

Introduction: Galeazzi fracture is a fracture of the distal third or medial third of the ulnar shaft associated with distal radioulnar joint dislocation. These lesions can be accompanied with others lesions.

Case presentation: 21 years old male victim of motorcycle slide with a Galeazzi like fracture accompanied with a fracture of the scaphoid, first and fifth metacarpal and which was treated surgically.

Discussion: Galeazzi fracture present the third of the fractures of the radius, the mechanism combines axial loading with excessive rotation. It's fracture of necessity nonsurgical treatment yields a poor result.

Conclusion: for our patient the mechanism suggests an axial loading with excessive pronation trained by the handlebar of the motorcycle.

Keywords: Galeazzi; Rolando fracture; Extensor carpi ulnaris; Scaphoid fracture; TFCC

1. Introduction

Galeazzi fracture is a fracture of the distal third or medial third of the ulnar shaft associated with distal radioulnar joint (DRUJ) dislocation [1].

Two principal mechanisms of injury in Galeazzi fracture have been reported. Hughston has proposed that Galeazzi fracture is usually caused by a direct blow to the dorsoradial aspect of the forearm. On the other hand, Mikic has proposed that the most probable mechanism is a fall on the outstretched hand combined with extreme pronation of the forearm [2]. The energy from the radius fracture gets transmitted towards the radioulnar joint leading to dislocation of the DRUJ [1].

Bony architecture only accounts for approximately 20% of the DRUJ's stability. The remainder of the stability is afforded by the surrounding soft tissue [3].

A Galeazzi fracture is considered a "fracture of necessity" as nonsurgical treatment yields a poor result [3].

* Corresponding author: Lamnaouar Foad; ORCID : <https://orcid.org/0000-0003-4636-0426>

We report the case of a patient with Galeazzi-like fracture (Galeazzi fracture with fracture of the cubital shaft) associated with a fracture of the scaphoid, fracture of the base of the first metacarpal type Rolando and fracture avulsion of the base of the fifth metacarpal corresponding to the insertion of the extensor carpi ulnaris.

2. Case presentation

A 21 years old male victim of a public road accident after a motorcycle slide, the patient had an impact point in his right wrist and forearm. Upon admission in the emergency department the patient had the attitude of upper limb trauma. The forearm had an angular deformation with anterior sinus, ulnar head protrusion and contusion of dorsal aspect of his hand (Fig.1).

The X-rays images objectivized a fracture of the radial Shaft with the distal fragment posteriorly displaced. An incomplete fracture line at the same level of the cubital shaft.

In the DRUJ were dislocated with a shortening of the radius, widening of the space between the two bones In the AP view, in the lateral view there was a complete posterior dislocation of the cubital head with fracture of the cubital styloid.

At the hand level there was a scaphoid fracture of its waist, Rolando fracture of the first metacarpal and fracture of the dorsal aspect of the base of the 5th metacarpal which correspond to an avulsion of the inserting site of the extensor carpi ulnaris (Fig.2,3).

The management was an ORIF of the radius fracture with plate fixation, an intramedullary k wire fixation for the cubitus. A temporary fixation of the DRUJ with a Kirschner pin. The scaphoid was fixed by Percutaneous screw and plate fixation for the Rolando Fracture (Fig.4).



Figure 1 Clinical presentation of the patient: impotence and deformation of the forearm and the wrist



Figure 2 The x-ray of the right forearm + wrist: AP view fracture of the two bones of the forearm, fracture of the ulnar styloid, fracture of the scaphoid the base of the first and fifth metacarpal. lateral view: dorsal dislocation of the cubital head



Figure 3 The CT scan of the patient

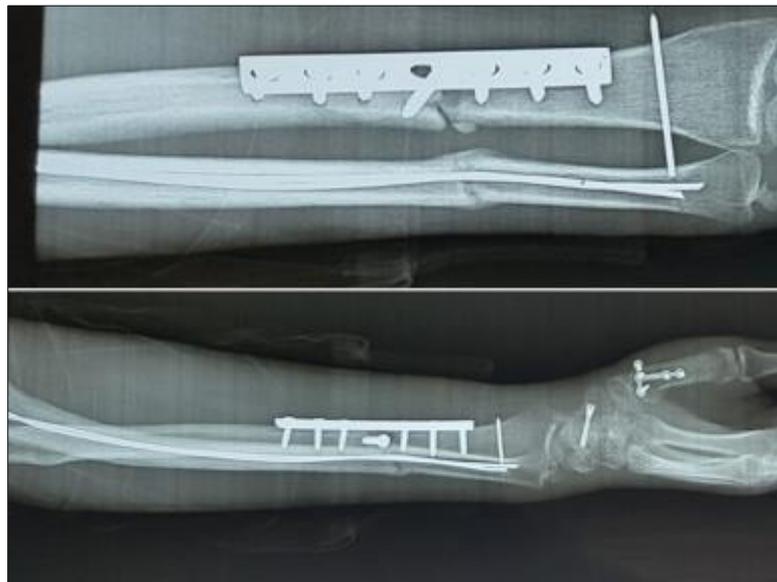


Figure 4 The surgical management of the patient: plate fixation of the radius, intramedullary k wire fixation the cubitus, stabilization of the distal radioulnar joint with a pin. percutaneous screw for the scaphoid et plate fixation for the first metacarpal

Long arm splint immobilization was maintained for two weeks after it has been changed above the elbow The pin of the arthrodesis of DRUJ was removed at 6 weeks

3. Discussion

This fracture was first described by Sir Astley Cooper in 1822 but the eponym Galeazzi fracture is based on a series of 18 patients described in 1934 by an Italian surgeon, Riccardo Galeazzi. Other eponyms used are reverse Monteggia fracture, and Darrach-Hughston-Milch fracture [4].

Galeazzi fractures account for approximately 7% of all forearm fractures in adults. One in four radial shaft fractures is a true Galeazzi injury. These fractures occur with a bimodal distribution, diaphyseal forearm fractures in young males are commonly due to high-energy trauma, and fractures in aging females are due to low-energy traumas such as falls from ground level [1].

The classification system based on Rettig ME and Raskin [5] who categorized Galeazzi fractures based on fracture stability. They found stability to be dependent on the distance of the radial fracture from the distal radial articular surface:

- Type I: Fracture occurring distally from the 7.5 cm demarcation (i.e., closer to the wrist) Associated with significant DRUJ instability in more than 50% of cases
- Type II: Fracture occurring proximally from the 7.5 cm demarcation (i.e., further from the wrist) Associated with significant DRUJ instability in only around 5% of cases [5].

The radiographic signs that suggest disruption of the DRUJ are fracture at the base of ulnar styloid, widening of the DRUJ space (on a true AP view), dislocation of the radius relative to the ulna (on a true lateral view), and more than 5 mm of shortening of radius relative to the ulna, although radiographic predictors of instability remain imperfect. Although injury to the distal radioulnar ligaments can be accompanied by a bony fracture of the styloid [4].

For Atesok and Jupiter the mechanism of injury includes excessive rotation of the forearm and axial loading to the wrist joint, leading to fractures and injury to the DRUJ. In adults, type 1 fractures are triggered by the axial loading to the supinated wrist joint, which results in dorsal displacement of the radius and volar dislocation of the distal ulna. Type 2 fractures are triggered by axial loading to the pronated wrist joint, resulting in volar displacement of the radius and dorsal dislocation of the distal ulna [6]

Bony architecture only accounts for approximately 20% of the DRUJ's stability. The remainder of the stability is afforded by the surrounding soft tissue. Which include the triangular fibrocartilage complex (TFCC), joint capsule, interosseus membrane (IOM), and musculotendinous units consisting of the extensor carpi ulnaris (ECU) and pronator quadratus [3].

Raju et al [2] described a Serie of 6 six patients with associated fracture of ulna in the same level or at different level [2]. other associated injuries have been described in the literature. Soon et al described a case of persistent radial head subluxation. Malik et al described two cases of acute elbow dislocation with radial neck fracture and traumatic DRUJ dislocation, whereas Shiboi et al reported an unusual case of a posterolateral elbow dislocation with an ipsilateral Galeazzi fracture [4]. Mikić coined the term Galeazzi-type fracture to describe a both-bone forearm fracture with an associated ipsilateral DRUJ dislocation. 25 of these injuries were both-bone forearm fractures with concomitant ipsilateral DRUJ dislocations [7]. Ulnar and radial shaft fractures with DRUJ dislocation were reported by Vaishya (six cases) and Ryan (one case), and referred to as Galeazzi-like fractures [8]. ulnar and radial shaft fractures with concomitant PRUJ and DRUJ dislocation Six cases of this injury are reported in literature, being named as combinations of Monteggia and Galeazzi injuries in the same forearm [8].

Galeazzi fracture is considered a “fracture of necessity” as nonsurgical treatment yields a poor result. Casting alone is associated with strong deforming forces acting on the distal fragment by the pronator quadratus, brachioradialis, thumb extensors, and abductors. At a minimum, the radius fracture should undergo an open reduction and internal fixation. After the radius has been fixed, the DRUJ should be stressed. If found stable, the patient can be immobilized and start early motion. If unstable, surgical stabilization should be achieved using the same protocol in the setting of the DRF with DRUJ instability [3].

For our patient the clinical and radiologic lesions suggest a damage of the majority of the soft tissue ensuring the stability of the DRUJ: rupture of the interosseous membrane, fracture of the styloid (lesion of the TFCC), and avulsion of the extensor carpi ulnaris.

4. Conclusion

The review of the literature and the topography can suggest with handlebar position an axial loading which is responsible of the fracture of the scaphoid and the Rolando fracture. the dorsal displacement of the distal fragment of the radius is due the axial loading in pronated wrist. the propagation of the loading took the way of the interosseus membrane with creation of fulcrum in the site of the fracture which give the dorsal displacement of ulnar head with

stresses applied to the TFCC which caused the fracture of the cubital styloid and avulsion of site inserting the extensor carpi ulnaris.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

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

References

- [1] Johnson NP, Smolensky A. Galeazzi Fractures. 2023 Jul 17. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. PMID: 29262123.
- [2] Raju Vaishya, Sundar Kumar Shrestha, Abhishek Vaish A Galeazzi-variant type fracture-dislocation in adults. Chinese Journal of Traumatology 2013;16(6):344-346
- [3] Qazi S, Graham D, Regal S, Tang P, Hammarstedt JE. Distal Radioulnar Joint Instability and Associated Injuries: A Literature Review. J Hand Microsurg. 2021 Jul;13(3):123-131. doi: 10.1055/s-0041-1730886. Epub 2021 Jun 19. PMID: 34539128; PMCID: PMC8440053
- [4] Garg, R., & Mudgal, C. (2020). Galeazzi Injuries. Hand Clinics, 36(4), 455–462. doi:10.1016/j.hcl.2020.07.006
- [5] Rettig ME, Raskin KB. Galeazzi fracture-dislocation: a new treatment-oriented classification. J Hand Surg Am 2001; 26(2):228–35.
- [6] Chae SB, Kwon JB. Pronation type Galeazzi-equivalent fracture: A rare case report (CARE-compliant). Medicine (Baltimore). 2019 Dec; 98(52):e18429. doi: 10.1097/MD.00000000000018429.
- [7] Ryan MK, MacKay BJ, Tejwani NC. Both-bone forearm fracture with distal radioulnar joint dislocation. Am J Orthop (Belle Mead NJ). 2013 May; 42(5):E30-2. PMID: 23710483.
- [8] Artiaco S, Fusini F, Sard A, Dutto E, Massè A, Battiston B. Fracture-dislocations of the forearm joint: a systematic review of the literature and a comprehensive locker-based classification system. J Orthop Traumatol. 2020 Dec 2; 21(1):21. doi: 10.1186/s10195-020-00562-8. PMID: 33263862; PMCID: PMC7710780.