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Fracture of Galeazzi: Retrospective Study in the Department of Orthopedic Traumatology of the University Hospital of Avicenne Rabat about 18 Cases

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Abstract **Original Research Article**

Our retrospective study focused on 18 cases of Galeazzi fracture-dislocations collected in the Traumatology and Orthopedics department at the Avicenne University Hospital in Rabat between 2005 and 2010. The objective was to demonstrate the severity of this injury, which is still rare and often misdiagnosed as an isolated radius fracture. The mean age was 32 years with a range from 24 to 60 years, and males were predominant with a sex ratio of 5:1. The main causes were traffic accidents (56%), followed by assaults and work accidents (18%). The right side was more frequently affected (55%). Surgical treatment was performed in all cases. The outcomes, evaluated according to the MICKIC criteria, were excellent in 14 cases (82.35%). The prognosis of Galeazzi fracture depends mainly on the initial treatment of the distal radioulnar joint lesions, which require careful clinical examination and good radiological analysis for their diagnosis.

Keywords: Galeazzi fracture-dislocations, Traumatology, diagnosis, Surgical treatment.

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INTRODUCTION

Galeazzi fracture-dislocation is characterized by the simultaneous presence of a fracture of the radial shaft and a dislocation of the distal radioulnar joint. In 1929, Schneck identified a condition characterized by a fracture of the radial shaft and a dislocation of the distal radioulnar joint. However, it was in 1934 that the Italian physician Riccardo Galeazzi provided the first detailed description of this injury in Milan and gave it his name: "Galeazzi fracture-dislocation." Since Haughston's report in 1957, several studies have been conducted on Galeazzi fracture-dislocations, and treatment in adults has evolved towards a unified surgical approach. The severity of this injury is mainly due to the dislocation of the distal radioulnar joint, which requires emergency management. Delay in treatment, often due to a lack of recognition of this dislocation, can have a serious impact on pronosupination function. The accurate diagnosis of Galeazzi fracture- dislocation requires careful clinical evaluation and precise radiology to allow for appropriate emergency management. In the context of a retrospective study of 18 cases treated in the Traumatology and Orthopedics department of the Avicenne University Hospital in Rabat, we will examine the management of this injury in our context and evaluate our therapeutic results in light of the most recent information from the literature.

MATERIAL AND METHODS

Over a period of five years, from January 2005 to January 2010, eighteen cases of Galeazzi fracture-dislocation were identified at Avicenne University Hospital in Rabat.

We retrospectively examined the medical records of all patients with Galeazzi fracture-dislocation. An epidemiological, clinical, and therapeutic study was conducted using a specifically designed detailed exploitation form. We decided to limit our case inclusion to those diagnosed in January 2010 in order to obtain sufficient follow-up to evaluate the outcome evolution.

RESULTS

• Epidemiology:

The average age of patients in our study was 32 years, with a range of 24 to 60 years. We observed

that the peak frequency was between 26 and 33 years, which corresponds to the most affected age group.

We observed that Galéazzi fracture-dislocation mainly affected men in our study, with a male-to-female ratio of 5:1, including 15 men and 3 women in our study. Associated injuries were identified in 8 patients, representing 44.4% of our sample.

• Etiopathogenesis:

Within the Department of Orthopedic and Trauma Surgery at CHU Avicenne in Rabat, we identified 18 cases of Galéazzi fracture-dislocation over a five-year period, from January 2005 to January 2010, out of a total of 420 forearm fractures treated in our department. We observed a predominance of the injury on the right side among patients with Galéazzi fracture-dislocation, with 10 lesions identified on this side compared to 8 on the left side.

We identified traffic accidents as the most frequent cause of Galeazzi fracture-dislocations, with a frequency of 56%. Assaults and work accidents were also involved in 18% of cases, while falls and sports accidents accounted for only 5% of the identified etiologies.

According to our retrospective study, direct impact on the outer edge of the forearm was identified as the mechanism in 4 patients (22.2%). In 6 cases, the mechanism was indirect, by falling on the palm of the hand with the forearm in pronation (33.3%). For the remaining 8 cases (44.5%), the mechanism was not specified as they were mainly related to traffic accidents.

• Clinical and Radiological Data

The clinical study revealed several functional and physical signs in patients with Galeazzi fracture-dislocation. All patients presented with pain and functional impairment. At the physical examination, a malposition of the traumatized upper limb with forearm deformity and shortening was observed in all patients. In 10 cases, wrist deformity and locking were found. In the remaining 8 cases, patients presented with wrist pain and anteroposterior instability of the ulnar head upon palpation. Radiological assessment consisted of taking frontal and lateral X-rays of the forearm including the elbow and wrist, as well as centered X-rays of the distal radio-ulnar joint in frontal and lateral views. These images were obtained in all patients to establish an accurate diagnosis of the Galeazzi fracture-dislocation. Results of the study showed that the radial fracture were mainly located at the junction of the middle and distal thirds or at the distal third, representing 77.7% of all cases. In the majority of cases, 94.43%, the fracture line was transverse or oblique. As for displacement, the fracture was displaced in 16 cases, representing 88.88%, with a predominance of interfragmentary overlap, which was observed in 15 cases, representing 83.33%. We established a classification based on our radio-clinical data for distal radioulnar joint (DRUJ) injuries. First-degree DRUJ injuries, characterized by wrist pain and normal radiographs, were found in 2 patients (11.11%). Second-degree DRUJ injuries, characterized by anterior or posterior subluxation of the ulnar head, were observed in 3 patients (16.6%).

We identified 10 cases (55.5%) of grade III lesions of the distal radioulnar joint (DRUJ), corresponding to dislocation of the ulnar head. Finally, we also noted 3 cases (16.6%) corresponding to equivalents of triangular fibrocartilage complex (TFCC) injury, represented by avulsion or fracture of the ulnar styloid process. Among these cases, we identified 1 ulnar styloid avulsion and 2 ulnar styloid fractures.

In the context of our study, we developed a classification of Galeazzi fracture-dislocation into three types (I, II, and III) based on the severity of the lesion of the distal radioulnar joint associated with the fracture of the radial shaft. We identified 2 cases of type I (11.11%), 3 cases of type II (16.6%), and 10 cases of type III (55.5%). In addition to these types, we also identified 3 cases of Galeazzi fracture-dislocation equivalents involving a radial shaft fracture associated with ulnar styloid avulsion or fracture, representing 16.6% of the cases studied.

• Therapeutic Management:

The average delay between the trauma and the intervention to treat a radius fracture is 2 days, with extreme cases ranging from a few hours to a month. This delay may be due to the unavailability of osteosynthesis materials in the operating room and prior visits to traditional healers.

Local-regional anesthesia was used in the majority of cases (77.7%), while general anesthesia was used in 22.2% of cases. All patients were operated on in a dorsal decubitus position with a pneumatic tourniquet at the root of the limb.

Fixation with a special DCP radius plate was adopted in all patients, with 7-hole plates used in the majority of cases (83.3%). In the two cases of open fractures, external fixators were used in an emergency. For injuries to the DRUJ, immobilization in a B.A.P plaster in a supine or prone position was used in 27.77% of patients, while R.U.D nailing was used in 72.22% of patients.

All patients received antibiotic prophylaxis and pain treatment. A Redon drain was left in place in all cases for an average of 2 days. Postoperative control radiography was performed for all patients, with satisfactory results in all cases.

The average length of hospital stay was 3 days, and rehabilitation began either immediately after surgery or in the 6th week. 7 patients were lost to follow-up.

• Therapeutic Results:

The therapeutic results of this study were evaluated in a total of 17 patients who were followed up for an average of 1 year (ranging from 6 months to 3 years). In terms of complications, one case of deep sepsis was observed in a patient with a type II open fracture, requiring plaster removal for surgical lavage and appropriate antibiotic therapy. No cases of pseudarthrosis were reported.

To evaluate the results, the MICKIC scoring criteria were adopted, which are based on alignment, consolidation, DRUJ status, and pronation-supination.

The analysis of the results allowed for distinguishing several aspects. Regarding the clinical outcomes, residual pain at the level of the DRUJ was reported in only one patient, while mobility was deemed satisfactory in the majority of patients. Indeed, 14 cases had a complete recovery of pronation-supination, while 2 cases had limited pronation-supination at 60-70°, and only one case had limited pronation-supination at 30°. The anatomo-radiological results revealed an average consolidation delay of 80 days for all fractures, which ranged between 60 and 90 days. The analysis of the results according to the anatomo-radiological classification of the Galeazzi fracture-dislocation showed that the best results were observed in types I and II. However, a poor outcome was reported in a patient with a base ulnar styloid avulsion that evolved into a pseudarthrosis due to initial negligence. Regarding rehabilitation, the results were better in patients whose rehabilitation started immediately postoperatively compared to those whose rehabilitation started at 6 weeks. The results were also analyzed according to the treatment, showing that patients treated with B.A.P. cast had less satisfactory outcomes compared to those who underwent R.U.D. nailing. Finally, the best results were obtained in patients treated early within the first three days, while the results were less satisfactory in patients operated on beyond one week.

DISCUSSION

The Galéazzi fracture-dislocation is a rare injury. This rarity can be explained by two main factors. Firstly, there is often a lack of knowledge about this specific injury, as the diagnosis of a Galéazzi fracture is often established only after that of an "isolated radius fracture," based on pain, functional impairment, and often sensations of snapping at the DRUJ. Secondly, forearm trauma usually affects both bones, thus protecting the joints. In our series, we reported 18 cases of Galéazzi fractures-dislocations out of 420 forearm fractures recorded between January 2005 and January 2010. This difference in frequency compared to other series can be explained by the fact that our hospital is the only surgical unit in the region and attracts both the city of Rabat and the surrounding municipalities.

Galéazzi fractures-dislocations are more common in young patients as the mean age in all series, including ours, does not exceed 36 years. This trend is due to the fact that young people are generally more active and dynamic, which exposes them more to this type of trauma.

All series report a male predominance except for Mickic's [1]. This difference can be explained by the nature of professions practiced by men as well as their participation in violent sports.

Our series differs from other published studies by joining Mestdagh's [2], which found a predominance of Galéazzi fractures-dislocations on the right side. This particularity can be explained by the predominance of right-handedness, which leads to a tendency to favor the right side when receiving trauma.

The predominance of road accidents followed by sports accidents is reported in the majority of series, including ours [1-6].

The Galeazzi fracture-dislocation is an injury that can easily go unnoticed despite its simple diagnosis. Indeed, the fracture of the radius is always detected, but the involvement of the distal radioulnar joint is often ignored, which explains why one-quarter of Galeazzi fracture-dislocations are included in so-called "isolated radius fractures".

Therefore, it is important to be cautious of apparently isolated radius fractures (2.6) because they are rare, and in these cases, it is always necessary to carefully examine the elbow and wrist [7]. The signs of this injury are predominant in the forearm, and it is possible to not detect a possible dislocation of the ulnar head if the examination is not thorough.

According to Dumontier [8] and Railhak [9], standard radiology is essential for accurately diagnosing the Galeazzi fracture-dislocation. It should include an anterior-posterior and a lateral view of the forearm, with images strictly centered on the D.R.U. joint. Wrist arthrography is also of great help in diagnosing first-degree injuries because it allows visualization of carpal and triangular ligament injuries, specifying their location and extent [8]. Furthermore, arthroscopy is even more effective in evaluating ligament injuries and can be used for both therapeutic and diagnostic purposes [9].

Currently, computed tomography is a valuable tool for diagnosing radio-ulnar incongruence or instability, as well as confirming ulnar head

subluxations that may not be detected by standard radiographs [8]. On the other hand, MRI is still being evaluated but seems promising in detecting peripheral lesions and triangular ligament avulsions, as well as specifying their location, degree, and extent. It is possible that MRI will become the reference examination for exploring this joint in the future [8].

According to Mansat [6], Mikic [10], and Reckling [11], the treatment of Galeazzi fracture-dislocations requires surgical intervention. The osteosynthesis technique using a special DCP radius screw plate is present in all reviewed series [4-6, 10].

The authors have adopted the following approach [3, 5-7, 12-14] for fixing the D.R.U joint:

First, reduction of the radial fracture usually results in the reduction of the D.R.U dislocation by closed reduction, either spontaneously or by external pressure on the ulnar head.

If reduction is achieved, it is maintained in two different ways:

- By horizontal radio-ulnar pinning at 4 cm above the temporary radio-carpal line for 3 to 4 weeks.
- By plaster immobilization in a stable position for 4 to 6 weeks, which is the approach adopted in almost all patients in the reviewed series.

In case of irreducibility, the ulnar head cannot be reduced due to the interposition of either the extensor carpii ulnaris muscle tendon, the triangular ligament, or sometimes the extensor digiti minimi muscle tendon. In this case, reduction must be performed surgically [15-18].

In Galéazzi equivalents, treatment is sometimes performed in an open setting to fix the fractured or avulsed ulnar styloid, which is then stabilized by horizontal R.U.D pins for 3 to 4 weeks [5]. Most authors [2, 3, 5, 10, 13, 14] report that appropriate surgical treatment of Galéazzi fracture-dislocation leads to satisfactory outcomes, with a success rate of 85% to 96% for good and excellent results. Reckling [11] achieved a 100% rate of excellent results.

CONCLUSION

Galéazzi fracture-dislocation is a rarely encountered injury, often confused with isolated fractures of the radius. It requires immediate management. Unfortunately, in our context, patients often visit traditional healers (Jebbars) before presenting to the hospital, resulting in a delay in treatment. This can have serious consequences, such as impaired pronation-supination function and chronic instability of the distal radioulnar joint. Several factors are closely linked to the prognosis of this injury, including the type of injury, open wound, and quality of care. In our practice, we prefer internal fixation of the radial fracture followed by plaster immobilization of the distal radioulnar joint, which seems to yield good results. However, rehabilitation is an essential component of managing this injury because without it, pronation-supination function can be severely compromised.

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