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*Corresponding author

*Nabili Yousra, IBN Rochd Hospital, Morocco.

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Monteggia like or Monteggia Associated with a Terrible Triad: How far the Spectrum of that Lesion Extends (A Case Report)

Nabili Yousra*, Bensitel Omar, El Adaoui saad, Abeljebbar messoudi, Mohammed rahmi, Mohammed rafai

IBN Rochd Hospital, Morocco

Abstract

Introduction: The elbow is considered to be a poorly tolerated joint given its tendency to stiffen easily and to be prone to instability. The Monteggia lesion, first described in 1814, is defined as a fracture of the proximal ulna associated with dislocation of the radial head.

Case report: A 52 year-old man who had a fall from the first floor, had an open fracture of the ulnar shaft, dorsolateral dislocation of the radial head with marginal fracture, a Morrey type 1 fracture of the coronoid process, and dislocation of the olecranon in the reverse sense of the radial head. In the wrist, there was a fracture of the distal radius and a fracture of the radial styloid.

The patient was traited by k wiring of the ulnar shaft and the distal radius, reparation of the annular ligament with temporary arthrodesis of the radioulnar joint and reinsertion of the lateral ligament of the elbow. The patient experienced stiffness of the elbow.

Discussion: The range of definitions of the monteggia lesion has extended since the first description in 1814. Authors have extended the spectrum of lesions covered by the name of Monteggia lesion and called Monteggia like. The mechanism of monteggia lesions or Monteggia -like lesions is still unclear.

Conclusion: The objective from categorizing the lesions must be to planify an approach to treat all the injuries caused by a unique mechanism, that is systematic and orderly.

Introduction

Complex dislocation fractures of the elbow constitute a challenging condition creating a diagnostic, therapeutic and prognostic problem. The elbow is considered to be a poorly tolerated joint given its tendency to stiffen easily and to be prone to instability [1].

In monteggia lesions, Bado classified 4 types based on the direction of displacement of the radial head and the angulation of the ulnar line, and the lesion mechanism dictates which lesion type will result. Type II is thought to be the most common (80%), followed by type I (15%), while types III and VI are relatively rare (5%) [2].

Type III is a fracture of the metaphysis, with angulation and dislocation of the head towards the outside. The mechanism of injury is the occurrence of stresses in abduction associated with supination in the case of dorsolateral displacement and pronation in the case of ventrolateral displacement [3].

In the terrible triad, the energy dissipates along a precise path, described as Horii's circle, leading to fracture of the radial head, fracture of the coronoid process and posterior dislocation of the elbow. The most common mechanism is a fall onto the palm of the hand with a combination of axial and valgus compression on the elbow and supination of the forearm relative to the humerus [3].

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The aim of this study is to report on a patient with a lesion association consisting of a dorsolateral displacement type III monteggia lesion associated with a fracture of the radial head, the coronoid process and a dislocation of the elbow corresponding to a terrible triad according to the Hotchkiss definition [1].

We report a review of the various elementary lesion associations, and the nosological frameworks in which these lesions have been classified, and we will seek to explain the lesion mechanism.

Observation 1

The reporting of this work follows the SCARE criteria [13], ensuring adherence to guidelines for quality reporting in case series.

A 52-year-old patient suffered a fall from the 1st floor with a point of impact on the right elbow with open trauma to the elbow, associated with closed trauma to the pelvis.

A radiological assessment revealed a dislocated elbow fracture with a Mason type 1 fracture of the radial head (marginal) with dorsolateral dislocation, a Morrey type 1 fracture of the coronoid process, and dislocation of the olecranon associated with a fracture of the ulna with external translation and overlap. In the wrist, there was a fracture of the distal radius and a fracture of the radial styloid.

The patient was admitted to the operating theatre as an emergency, and the procedure consisted of osteosynthesis of the radial styloid using two pins inserted into the medial cortex, the ulna by a descending pinning using two pins, an arthrodesis of the proximal radiocubital and then a lateral approach that revealed a subcutaneous head with rupture of the capsuloligamentous plane and a bald aspect of the lateral epicondyle,. The repair was carried out after reduction of the elbow dislocation and resection of the osteocartilaginous fragment of the radial head, and consisted of repair of the annular ligament using sutures, followed by reinsertion of the external ligament plane using transosseous sutures. After this repair, the elbow was stable in flexion-extension and external rotation, so an internal approach was not indicated.

The patient was readmitted at 3 weeks for the ablation of proximal arthrodesis of the radioulnar joint, and a letter of rehabilitation was given.

The evolution was marked by the absence of consolidation of the cubitus 2 months and a persistence of pain, which restrained the patient from beginning early rehabilitation. The elbow was blocked in extension. Radiological control shows a calcification all around the elbow joint.

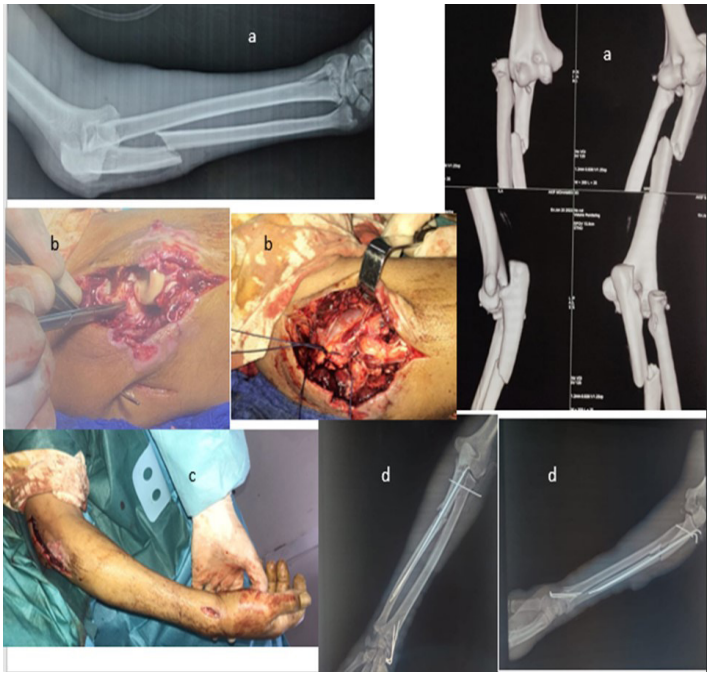

Figure 1: *Radiological assessment of the terrible triad + monteggia lesion b. External approach + repair of the external ligament plane c. Testing after osteosynthesis repair d. Radiological control*

Figure 2: *3 weeks clinical aspect with the imagery after pin ablation of radio ulnar pin*

The patient will be programmed for revision surgery. However, the prognosis remains reserved given the installation of stiffness of the elbow.

Discussion

The Monteggia lesion, first described in 1814, is defined as a fracture of the proximal ulna associated with dislocation of the radial head [4]. Monteggia lesions account for 2 to 5% of fractures of the proximal end of the two bones of the forearm. In 1967, Bado spoke of Monteggia lesions and established a classification of 4 types. Type I corresponds to an anterior dislocation of the radial head, type II is a posterior dislocation of the head, type III is a lateral dislocation, and type IV is defined by a fracture of both forearm bones with dislocation of the radial head [5].

Jupiter et al. further, classified type II lesions according to the location of the fracture line and the type of fracture

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of the radial head [5]. The monteggia lesion may be associated with fractures of the radial head or coronoid process described by Bado, under the equivalent name of Monteggia lesions [6].

However, the Monteggia lesion may be associated with a group of lesions that are not included in the Bado and Jupiter classification. Giannicolla et al [7] identified six elements of a Monteggia Like lesion, the combination of which explains the complexity of treatment:

1 Ulnar fracture

2 Radio-humeral dislocation

3 Ulno-huméral dislocation

4 Proximal radioulnar dislocation

5 Radial fracture

6 Distal radioulnar disjunction /interosseous membrane lesion

The coexistence of dislocation and associated fracture of the coronoid process or radial head exposes the patient to a risk of reoperability, which remains high in the various series. Ring et al reported 48 patients with monteggia lesions, and 6 of the 8 patients with poor results had an associated fracture of the coronoid process or of the radial head [6]. Jupiter et al [8], in a series of 11 patients with a monteggia lesion, noted an excellent result, according to the Broberg Morrey score, in three patients, an average to good result in seven patients and a poor result in one patient.

Strauss et al [9] studied 28 patients admitted for a Monteggia type II lesion (with posterior displacement of the head). In 6 of these patients, there was an association with a posterior dislocation of the elbow. The association of a posterior dislocation is thought to result in a greater loss of mobility of the elbow, particularly with regard to extension. Of the six patients operated on for this association, 3 needed repeat surgery [9].

The mechanism of injury for a type II monteggia lesion associated with a dislocation of the elbow suggests a first dislocation due to a fall on a limb in extension and abduction. The alternative explanation would be a monteggia lesion following direct trauma with the elbow in flexion, with dislocation occurring as a second stage [9]. Nadeem et al. speak of injuries that occur in extension with varus forces that fracture the ulna, and the energy released crosses the interosseous membrane and annular ligament to rupture it. With the continuing traumatic force and the existence of a pivot within the fracture site of the ulna, lateral dislocation of the head will occur [10]. The mean revision rate in the review by Weber et al [4] was 23%, which proves that the difficulties still posed by these lesions, nonunion of the ulna, failure of osteosynthesis (28%) and posterolateral instability of the radial head (12%) were the main reasons. Locked plates showed better results than reconstruction plates or 1/3-tube plates [4].

When the monteggia lesion is associated with a fracture of the coronoid process, there is a high risk of anteroposterior huméroulnar instability. It is also important to reconstruct fractures of the radial head using mini screws in the case of Mason II fractures. In the case of Mason III fractures, arthroplasty or resection should be considered if there is integrity of the medial ligament, the coronoid process and the interosseous membrane (Essex Lopresti lesion) [9].

The management of the terrible triad is currently codified [11,12] and is based on the following principles:

Transform the dislocation fracture into a simple fracture and then keep the elbow reduced

The risk of reluxation is reduced by fixation or replacement of the radial head, reinsertion of the external collateral ligament on the epicondyle and, if necessary, repair of the coronoid process.

Restoring capitulo-radial contact is a key element in restoring elbow stability

As long as the elbow remains reduced, the ulnar collateral ligament will be able to heal.

If repair of the coronoid, radial head and external collateral ligament does not prevent redislocation, repair of the medial collateral ligament will be considered.

For our patient, the initial treatment was osteosynthesis by intramedullary K-wire fixation, necessitated by the open nature of the lesions and the patient's emergency care. Repair of the annular ligament was reinforced by arthrodesis of the proximal radioulnar joint, which was maintained for 15 days. Then, there was combination of injuries to the elbow, the management of which was based on the principle of repairing a terrible triad from medial to lateral: a Morrey type I coronoid process fracture that did not require fixation, resection of the fragment of the head that could not be fixed, and repair of the lateral ligament plane. The elbow was stable and free of laxity. The criticisms of our management were unstable osteosynthesis, which meant that rehabilitation was not started.

Conclusion

the objective from categorizing the lesions must be to planify an approach to treat all the injuries caused by a unique mechanism, a treatment that must be systematic and orderly. Our case represents a complex fracture dislocation of the elbow that could be approached as a

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monteggia like lesion, a monteggia lesion associated with the terrible triad or even a divergent dislocation of the proximal radioulnar joint, which are all rare entities. Even if there was a complexity of the lesion, the approach provided stability for the elbow but not the ulna, and with the lack of rehabilitation, the elbow developed stiffness.

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Ethical approval: The case report is exempt from ethical approval at our institution, and only consent is necessary.

Consent: Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Declaration of competing interest: The authors declare no conflict of interest.

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