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An atypical type of monteggia equivalent: A case report

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Abstract

Monteggia fracture dislocations comprise about 5-10 % of all forearm fractures in adults and was first described in 1814. Since then there has been many descriptions of Monteggia equivalents. We present a case of 33 year old female with fracture of diaphysis of ulna with fracture shaft of radius proximal 1/3rd with posterior radial head dislocation managed by open reduction and internal fixation of both radius and ulna by LCDCP and screws with reduction of radial head and its functional outcome.

Keywords: Monteggia fracture dislocation, monteggia equivalent

1. Introduction

Giovanni Battista Monteggia first described this injury in 1814 where he depicted fracture of the proximal ulna with a dislocation of the radial head and was eponymously named Monteggia fracture dislocation^[2]. Later in 1967 Bado classified these injuries into four main types wherein he also described several Monteggia equivalents possessing similar characteristics to his types 1 and 2^[3]. There were no equivalents for type 3 and 4. Bado type 2 fractures have been subdivided into four types by Jupiter and his colleagues^[4]. In type 2a, the fracture of the ulna involves the distal part of the olecranon and the coronoid process. In type 2b, the fracture is at the metaphyseal-diaphyseal junction distal to the coronoid, and in type 2c, the fracture is diaphyseal. The fourth subtype, type 2d, extends into the proximal half of the diaphysis of the ulna. A complex variation of the type 2 Monteggia with associated ulnohumeral dislocation has also been reported^[5]. The bado classification is dependent on the dislocation of radial head. In our case report there was fracture of both bone with posterior radial head dislocation so we conclude it is a type 2 unexplained variant. Since then various types and their equivalents have been described in the literature. We present a rare case which can be included under type II Monteggia equivalent.

2. Case history

A 33 year old female presented to our hospital 2 hours after injury with a history of fall from stairs at home. Her chief complaints were pain, swelling, deformity and inability to use her right forearm. The patient was keeping the forearm extended and supinated and there was no external injury. There was crepitus and local tenderness along the ulna middle 1/3rd and proximal 1/3rd of. Antero-posterior and lateral radiographs showed there was a fracture of middle 1/3rd of shaft of ulna with fracture of proximal 1/3rd of shaft of radius with posterior dislocation of radial head. On neurological assessment posterior interosseous nerve injury was observed (figure 1 and 2).

The patient was taken up for surgery second day after taking all fitnesses for anaesthesia and operated with open reduction internal and internal fixation with Limited contact dynamic compression plate first radius was fixed first with Thompson approach with 7 holed LCDCP and radial head was reduced and ulna was fixed later with 7 holed LCDCP and above elbow pop slab was applied. Postoperative x-rays (figure3 and 4) showed acceptable reduction of radius and ulna with reduction of radial head. Suture removal was done on 14th day and physiotherapy exercises were started at 6 weeks. Six weekly follow up radiographs showed gradual healing of the fracture with union achieved at 3 months. At one year follow up patient has good DASH score and excellent MAYO elbow score with good functional range of motion at both the elbow and the wrist.

3. Discussion

Monteggia fracture dislocations in adults comprise less than 5% of all forearm fractures. After the first description by Monteggia in 1814 as fractures of the proximal ulna with a concomitant dislocation of the radial head, they were further classified by Bado in 1967 where he has referred to these as “Monteggia lesions” [6, 7]. Bado also described injuries that possessed similar characteristics and called them Monteggia equivalents. The variants have been classically described for Monteggia type 1 and 2 and there were no equivalents for type 3 and 4.

Bado stated that there were no equivalents to type-II Monteggia lesions other than epiphyseal fracture of the radial head or fracture of the radial neck. Considering the mechanism of this injury as defined by Penrose, a dislocation of the posterior part of the elbow could be included as a type-II equivalent in children. Our case was a type-II equivalent lesion characterized by a fracture of the ulnar diaphysis with posterior angulation at the fracture site as well as a radial diaphysis fracture with posterior dislocation of the radial head. Bado and other authors attributed the Monteggia lesion to extension and hyperpronation of the forearm. This mechanism is the most common; however, a direct posterior force acting on the raised ulnar shaft, as in a nightstick fracture, is another mechanism. As described by Penrose [7], a longitudinal force in a forearm that is flexed 60 is an additional mechanism. Jupiter *et al.* also suggested that the fracture has a mechanism of injury that is similar to elbow dislocation, with an axial load on the forearm and elbow but without forced rotation of the forearm. Adopting this same perspective, the mechanism of injury is similar to the mechanism of posterior dislocation of the elbow, where initially the elbow is in hyperextension. Thomas [9] and Schwab [8] *et al.*, in an experimental study, showed that posterior dislocation was more frequent when the elbow was in hyperextension



Fig 3: Reduction POST



Fig 4: Flexion rotation



Fig 5: Extension



Fig 6: Internal rotation



Fig 1: PRE OP XRAY C arm photo with posterior radial head dislocation



Fig 2: C arm photo with radial head OP XRAY



Fig 7: External



Fig 8: Month follow up x-ray

4. Conclusion

The “Monteggia lesion” as described by Bado has been classically described to have two types of variants. One of the examples of type 2 variant does describe fracture piphyseal fracture of the radial head or fracture of the radial neck and Posterior elbow dislocation could be included as a type-II equivalent considering the mechanism of injury defined by Penrose^[7], however, as far as the knowledge and research of the author is concerned, there has not been any mention of a fracture of the ulnar diaphysis with fracture of radial diaphysis with dislocation of the radial head posteriorly. Hence based on the above described fracture characteristics and mechanism of injury, it is postulated that such a fracture pattern shall fall in the type 2 variant of the Monteggia variant as an atypical type.

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