

A Novel Case of Neglected Monteggia Fracture Dislocation

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Abstract

Background: The Monteggia fracture-dislocation is a rare condition among children, and its treatment is still controversial. The treatment can become quite complicated when the diagnosis is delayed. There is a broad range of surgical treatments with various complications like subluxations, degenerative changes, and radial head deformity. The present case was reported as a novel surgical treatment choice for neglected Monteggia fracture-dislocation.

Case Report: A 16 year-old boy presented with left elbow severe range of motion (ROM) limitation and pain who was diagnosed with neglected Monteggia fracture-dislocation. The patient went through open reduction beside internal fixation of the ulnar shaft via Limited Contact Dynamic Compression Plate (LC-DCP) and radio-capitellar joint reduction and provisional fixation by a pin. The patient recovered after three months with a significant increase in elbow ROM without any complications.

Conclusion: This method could be an appropriate treatment of choice for neglected Monteggia fractures which indeed had excellent outcomes without complication.

Keywords: Elbow; Joint Dislocations; Monteggia's Fracture

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Background

Giovanni Battista Monteggia described the Monteggia fracture in 1814 as a proximal ulnar fracture associated with dislocation of the radioulnar and the radio-capitellar joints (1). It is a severe and also rare kind of fracture (2) that occurs due to falling on an extended elbow with a hyper pronated forearm. Bado proposed a classification for the Monteggia fracture based on the angulation and dislocation side of the ulna and radial head, respectively (3).

The forearm fractures account for 20 to 30% of children's fractures (4), whereas Monteggia fracture-dislocation rarely happens (< 1% of all fractures in children). Its prevalence is more common among the 4 to 10 year-old children (5), and about 50% of them are misdiagnosed (6, 7), particularly when the radial head dislocation is accompanied by an ulna greenstick fracture (6, 8). On the other hand, missing the early reduction of this fracture-dislocation leads to chronic Monteggia, which is estimated to happen in up to 20% of cases (9). The neglected Monteggia fracture may present with discomfort, movement limitation (especially on flexion and supination), elbow deformity, stiffness, late neuropathy, osteoarthritis, and weakness (10). There are several surgical methods to correct this complication, including open reduction and reconstruction of the ulnar ligament (11, 12), open reduction with an ulnar osteotomy (13-15), ulnar osteotomy, and progressive correction with an external fixator (15, 16), radial osteotomy (17, 18), and excision in the radius head (19, 20). A novel surgical method was performed on our chronic Monteggia fracture-dislocation which had an appropriate outcome.

Case Report

History: A 16 year-old boy presented to the clinic complaining of a severely restricted range of motion

(ROM) and pain in his left elbow. He had a history of trauma to his left forearm at a wrestling match two months ago, which had been diagnosed as proximal ulnar fracture based on the x-ray performed (Figure 1). Closed reduction and casting had been performed, however a controlling x-ray had not been performed. The cast had been removed four weeks later. Since then, he had pain and restriction of ROM.



Figure 1. Left forearm x-ray obtained after trauma

Physical Examination: At the time of presentation, he had his arm at flexion with mild tenderness on the left elbow without any neurovascular deficit. Other physical examinations were normal. Subsequent x-ray (Figure 2) revealed radial head anterior dislocation. The patient was a candidate for surgery with a neglected Monteggia fracture diagnosis.

Methods: Open reduction and internal fixation (ORIF) of the ulnar shaft using a Limited Contact Dynamic Compression Plate (LC-DCP) was performed. Due to the patient's young age and lack of evidence for radial head deformity during surgery, the reduction of the radial head was conducted by lateral Kocher's approach.

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Figure 2. Left elbow x-ray two months after trauma at the time of presentation

Despite stability, the radio-capitellar joint provisional fixation was performed by a pin to prevent dislocation. The elbow was splinted at 90-degree flexion (Figure 3), which was opened four weeks later, accompanied by pin removal.

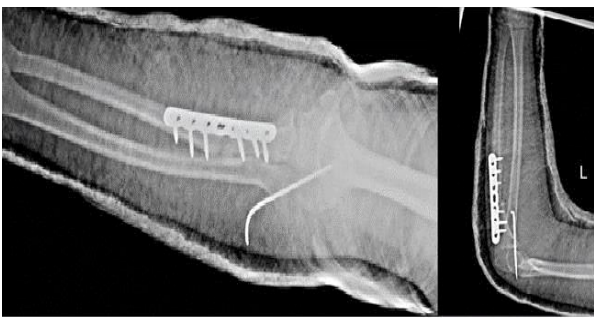


Figure 3. Post-operation x-ray of left elbow, Limited Contact Dynamic Compression Plate (LC-DCP) applied for internal fixation of ulna; radio-capitellar pin was used to fix radial head, patient's arm was cast at 90° flexion

Regular physiotherapy was performed during the follow-up period. Three months after the operation, the

patient's elbow flexion and extension improved from 50 to 30 and 70 to 100, respectively (Figure 4). The follow-up x-rays showed no complications (Figure 5).

Discussion

Monteggia fracture-dislocation is a relatively rare injury, accounting for about 1% of all pediatric forearm fractures (5, 21). The term 'Monteggia fracture' includes all ulnar fractures accompanying radial head dislocation, regardless of its location (22). These fractures are one of the most frequently missed injuries, especially in children. Depending on the care providers' expertise and experience, these injuries may be initially missed about 25 to 50% of the time (6).

An unreduced dislocation of the radial head for more than four weeks is considered chronic, while neglected Monteggia fracture-dislocation and its treatment among children are still controversial (23). The radial head may be left in its dislocated position or excised at maturity if pain or restriction of motion presents. Late reconstruction aims to reduce the dislocated head and reconstruct the annular ligament. An osteotomy may accompany reconstruction to shorten the radius, a corrective ulnar osteotomy at or proximal to fracture site, or radial and ulnar osteotomies (18).

In a study, 22 children, ranging from 4.1 to 13.6 years old, formed the study group in which a chronic radial head dislocation was diagnosed as a sequela of a Monteggia fracture. The interval between the primary trauma and the correctional surgery ranged 1-128 months (mean 15.7 months). Three patients who underwent osteotomy, gradual lengthening, and angulation of the ulna by external fixation, and another two patients who underwent open reduction and repair or Bell-Tawse reconstruction of the annular ligament had permanent radial head subluxation at the follow-up but had no or mild functional problems.

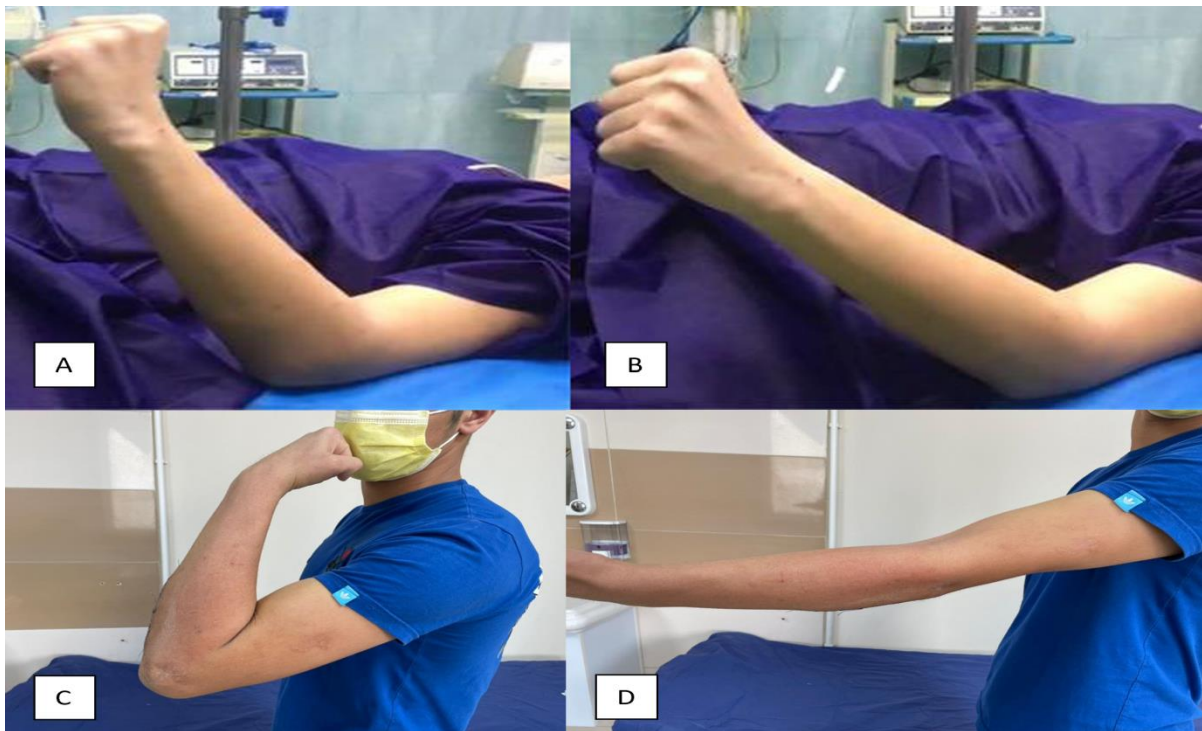


Figure 4. Left elbow range of motion (ROM): A and B: flexion and extension before operation, respectively; C and D: flexion and extension after operation, respectively

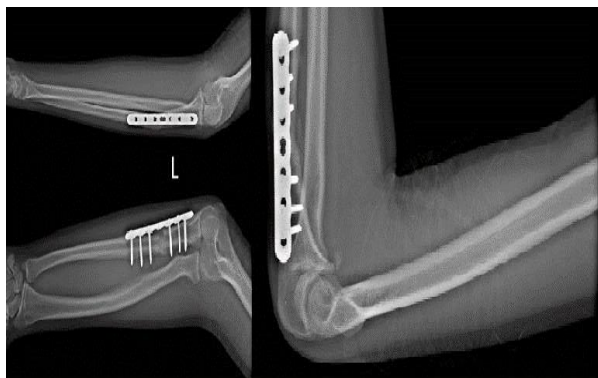


Figure 5. Left elbow x-ray at the three month follow-up

Two cases who had ulnar osteotomy at the middle third developed a delayed union in addition to the radial head subluxation, which required bone grafting that was unsuccessful, followed by ORIF in addition to bone grafting as treatment of the complication. One patient, who underwent ulnar osteotomy and stabilization using a plate, had a delayed union that healed eventually without further surgery in eight months. Another patient who underwent osteotomy at the distal medial third of ulna and gradual lengthening and angulation of the ulna by an external fixator, non-union occurred with ulnar diaphyseal deformity, and the supination arc of movement was lost (24).

In our case, the follow-up x-ray showed no degenerative changes and no radial head deformity. While residual subluxation is the most common post-operation complication in neglected Monteggia fracture-dislocations (24), there was no subluxation in our patient's elbow. Moreover, the posterior interosseous nerve and radial nerve both were intact after surgery that demonstrates minimal complications. The surgical method used to address the neglected Monteggia fracture-dislocation in this patient could potentially be one of the choices for surgical treatment in similar cases.

Conclusion

This case emphasizes the importance of attention to the elbow joint in control x-ray in any case of ulnar fracture, in order to prevent the neglected Monteggia fracture-dislocation. Moreover, the surgical method used to address neglected Monteggia fracture-dislocation in this patient could potentially be one of the choices for surgical treatment in similar cases in particular with stress on its limited complications.

Conflict of Interest

The authors declare no conflict of interest in this study.

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