

Management of Neglected Pediatric Monteggia Fracture-Dislocation: A Case Report and Literature Review

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Abstract

Background: Missed or neglected Monteggia lesions are defined as classical fracture-dislocation presenting at least four weeks after injury. This injury in children is often challenging to treat and requires complex methods to achieve optimal results.

Case Report: We report a 6-year-old girl with a 2-month-old neglected Bado type-I Monteggia fracture-dislocation. Our patient underwent ulnar osteotomy, bone grafting, and fixation with a semi-tubular plate along with open radial head reduction. Although the patient experienced wound complications at the bone graft harvest site, she achieved an excellent outcome with restored functionality and range of motion (ROM).

Conclusion: Neglected Monteggia injuries in pediatric patients demand multifaceted treatment approaches due to their complexity and potential for long-term functional impairment. The absence of a consensus on definitive treatment underscores the importance of early diagnosis and open reduction to enhance long-term outcomes. This case report highlights the effectiveness of ulnar osteotomy, plate fixation, and open radial head reduction in achieving favorable results.

Keywords: Elbow Fractures; Forearm Injuries; Monteggia Fracture Dislocations; Osteotomy

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Background

A Monteggia fracture-dislocation is defined as a proximal one-third ulna fracture associated with a radial head dislocation or subluxation. Boyd and Boals in 1969 defined a late missed Monteggia lesion as the classical fracture-dislocation presenting at least four weeks after injury (1). These fractures account for only 1% of pediatric forearm fractures and are quite rare (2).

The management of neglected Monteggia fracture-dislocation in children is often more complex than fresh fractures and may involve a combination of various treatment modalities. In this study, we aimed to report a 6-year-old girl who presented to our institute with a neglected two-month-old Monteggia fracture-dislocation of the right forearm.

Case Report

A six-year-old girl presented to our hospital with a complaint of deformity in the right forearm for two months. She had fallen from a height of about five feet and sustained an injury to the right elbow. She was taken to a traditional bone setter for treatment by her parents. The pain subsided but the deformity in the right elbow persisted.

Physical examination revealed a scar on the posterior aspect of the right elbow joint, deformity of the right forearm, and limited range of motion (ROM) in the elbow joint (Figure 1). There were no distal neurovascular deficits. Plain radiographs of the right forearm and elbow showed a malunited fracture of the proximal one-third ulna with anterior dislocation of the radial head (Bado type 1 Monteggia fracture-dislocation) (Figure 1). The patient was admitted and routine pre-operative blood

investigations were ordered.



Figure 1. Clinical photographs showing a deformity of the right forearm and radiographs showing Bado type 1 Monteggia fracture-dislocation

Through Boyd's approach, ulnar osteotomy was done and a 5-hole semi-tubular plate (Figure 2) was placed along with cancellous bone graft harvested from the right proximal tibia. The plate was bent along the contour of the bone. The radial head required open reduction. It was then held in place with a 1.8 mm transcondylar Kirschner wire (K-wire) (Figure 3A).



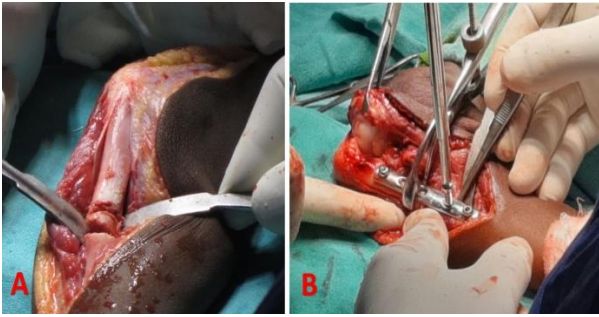


Figure 2. Intraoperative photo of ulnar osteotomy and internal fixation with a 5-hole semi-tubular plate

The annular ligament was intact. Post-operatively, the limb was immobilized in an above-elbow plaster of Paris slab for two weeks. The K-wire and slab were removed after two weeks and elbow ROM exercises were started.

Two months after surgery, there was considerable improvement in the ROM of the elbow joint and forearm. The patient reported intermittent serous discharge from the right leg three months post-surgery, attributable to the application of bone wax for hemostasis during the graft harvesting procedure. However, this issue was successfully resolved through wound exploration and removal of the residual bone wax. Follow-up radiographs at 6 months showed the union of osteotomy (Figure 3B).

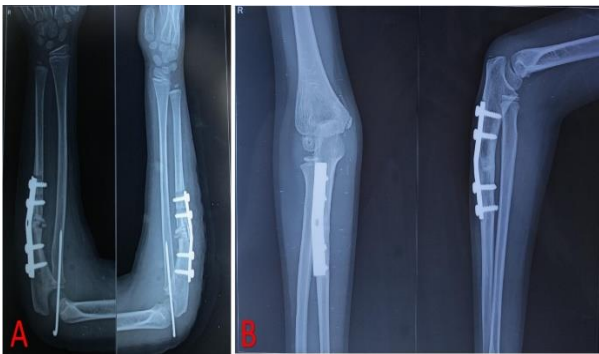


Figure 3. A) Immediate post-operative radiograph; B) Radiograph at six months of follow-up showing union of the ulnar osteotomy

The follow-up period of three years was uneventful and

the patient attained normal ROM in the elbow and forearm (Figure 4). There were no associated complications like heterotopic ossification, implant breakage, or implant prominence. The patient was able to do her daily activities without any hindrance. Surgery for implant removal was done three years after the first surgery and the postoperative period was uneventful.

Discussion

Monteggia fractures are very rare and account for only 1% of pediatric forearm fractures. Neglected or missed Monteggia fractures are described as cases presenting four weeks after the initial trauma. A study by Mathur and Lau reported that 25.5% of Monteggia fractures were missed by radiologists, while 15% of these fractures were missed by emergency and orthopedic clinicians in the initial trauma setting (3).

Often, more emphasis is given to the ulna fracture resulting in the radial head dislocation getting overlooked. The radiographic image of the elbow joint may be of poor quality or the radial head is poorly exposed and the definitive treatment is often based on the primary radiograph leading to overall poor outcomes (4). Acute pediatric Monteggia fractures can be managed conservatively with closed reduction and cast immobilization. More than 90% of missed Monteggia injuries are sequelae of Bado type I injuries (5). Chronic, missed, or neglected Monteggia fractures may need various kinds of treatment. Neglected injuries often result in elbow instability, deformity, and loss of pronation and supination. If left undiagnosed or untreated until reaching skeletal maturity or adulthood, individuals typically experience minimal functional limitations (6).

Surgery may be indicated for pain from radial head impingement, elbow discomfort during activities, or anticipated valgus deformity (7, 8). Some authors consider that simply the presence of a dislocated radial head in a child with a missed lesion is an indication for surgery (9, 10). Several surgical techniques have been described like ulnar and radial osteotomies, open or closed reduction of the radial head, repair or reconstruction of the annular ligament, temporary fixation of the radial head with a trans-articular wire, bone grafting, ulna lengthening using Ilizarov technique, radial head excision, or combination of these techniques (11).



Figure 4. At three years follow-up: Clinical photographs demonstrating a full range of motion (ROM) in the elbow and forearm; radiograph showing remodeling of the ulnar osteotomy

There is no clear consensus about the most favorable technique. Open reduction with ulnar osteotomy with or without annular ligament reconstruction is the most commonly performed procedure (12). The decision to perform annular ligament reconstruction depends on the observation of radial head instability during surgery (13).

If indicated, annular ligament reconstruction may be done using the Bell-Tawse technique (using the lateral triceps tendon) (14) or the Papendrea and Waters technique (using forearm fascia) (15). The radiocapitellar joint is very sensitive to ulna length (12). Therefore, an ulnar osteotomy is the keystone treatment in achieving and maintaining reduction of the radial head in Monteggia fracture-dislocation.

Xu et al. retrospectively evaluated a method based on center of rotation of angulation osteotomy of the ulna for treating Bado type I Monteggia injuries in 5 patients (16). All patients in their study achieved stable radial head reduction, successful ulnar osteotomy healing, and excellent outcomes as per the Broberg and Morrey index. There were no complications, including pain, neurological issues, vascular problems, or implant breakage.

He et al. conducted a retrospective analysis of 42 children with fresh (n = 25) and neglected (n = 17) Monteggia fracture-dislocations (17). In the neglected group, post-treatment scores included 10 excellent, 4 good, and 3 fair outcomes. The locking compression plate was the primary postoperative immobilization choice, with three patients experiencing recurrent dislocation. More recently, Najafi et al. reported excellent outcomes in a 16-year-old boy with a neglected Monteggia fracture treated using a limited contact dynamic compression plate (LC-DCP) and radiocapitellar joint reduction (18).

Removal of the radial head should be considered a last-resort procedure, to be undertaken only when reconstructive surgery is not feasible or skeletal growth has ceased (9). An important differential diagnosis to the neglected or missed Monteggia injury is congenital radial head dislocation. This condition is frequently bilateral and accompanied by elbow valgus deformity, along with radiographic changes in the distal humerus and dysplasia of the radial head and neck (5).

Conclusion

Neglected Monteggia injuries in pediatric patients demand multifaceted treatment approaches due to their complexity and potential for long-term functional impairment. The absence of a consensus on definitive treatment underscores the importance of early diagnosis and open reduction to enhance long-term outcomes. This case report highlights the effectiveness of ulnar osteotomy, plate fixation, and open radial head reduction in achieving optimal results.

Conflict of Interest

The authors declare no conflict of interest in this study.

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in this case report.

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