

(CASE REPORT)



NEGLECTED MONTEGGIA FRACTURE-DISLOCATION IN AN ADOLESCENT: CLOSED REDUCTION OF THE RADIAL HEAD FOLLOWING ULNAR OSTEOTOMY

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ABSTRACT

Neglected Monteggia fracture-dislocations represent a therapeutic challenge due to the difficulties associated with radial head reduction and restoration of elbow function. We report the case of a 16-year-old adolescent presenting with a Bado type I Monteggia fracture-dislocation that had remained untreated for three months following loss to follow-up. Clinical examination revealed limited elbow flexion and complete loss of forearm pronation and supination. Radiographs demonstrated ulnar malunion associated with persistent radial head dislocation. A transverse ulnar osteotomy followed by realignment and fixation with a dynamic compression plate (DCP) allowed indirect reduction of the radial head without surgical exposure of the joint. Temporary humeroradial pin fixation was performed to maintain the reduction. At the three-month postoperative follow-up, the patient showed a favorable outcome, with radiographic union of the ulnar osteotomy, maintained radiocapitellar alignment, and full recovery of elbow flexion-extension and forearm pronation-supination. This case highlights the feasibility of indirect radial head reduction following ulnar realignment in selected patients with neglected Monteggia injuries. However, the success of this approach depends on the anatomical characteristics of the injury and the reducibility of the radial head. Longer-term follow-up is required to assess the maintenance of reduction and the durability of functional recovery.

Keywords: Monteggia fracture-dislocation; Neglected injury; Ulnar osteotomy; Closed reduction; Adolescent; Case report.

1 INTRODUCTION

Monteggia fracture-dislocation combines an ulnar fracture with dislocation of the radial head. Delayed management poses a therapeutic challenge, particularly because of residual bony deformity, changes in periarticular structures, and difficulties in reducing the radial head. An injury is generally considered neglected when radial head dislocation persists for more than four weeks after trauma, although this definition is not universally accepted [1,2].

Surgical treatment aims to restore radiocapitellar congruity, correct ulnar deformity, and preserve elbow mobility. Corrective ulnar osteotomy plays a central role in reconstruction. However, the need for open radial head reduction, annular ligament reconstruction, or additional stabilization remains controversial [1,3].

We report the case of a 16-year-old adolescent with a Monteggia fracture-dislocation neglected for three months, in whom ulnar osteotomy enabled indirect reduction of the radial head without surgical exposure of the joint, with complete recovery of elbow and forearm rotational range of motion at three months postoperatively.

2 CASE PRESENTATION

2.1 Clinical presentation

A 16-year-old right-handed adolescent with no significant medical or surgical history presented with functional limitation of the right elbow that had persisted for three months.

The patient had sustained a closed injury to the right elbow in a road traffic accident. A Monteggia fracture-dislocation had been diagnosed during the initial emergency department visit. However, the patient was subsequently lost to follow-up, resulting in a three-month delay in treatment.

On examination, elbow flexion was limited, and forearm pronation and supination were completely absent.

2.2 Radiographic assessment

Standard anteroposterior and lateral radiographs of the right elbow demonstrated ulnar malunion associated with persistent dislocation of the radial head. These findings were consistent with a Bado type I Monteggia fracture-dislocation (Figure 1).

Given the three-month interval since the injury and the persistent radial head dislocation, the diagnosis of a neglected Monteggia fracture-dislocation was established.



Figure 1: Preoperative anteroposterior (A) and lateral (B) radiographs of the right elbow obtained three months after injury, showing ulnar malunion associated with persistent anterior dislocation of the radial head, consistent with a Bado type I Monteggia fracture-dislocation.

2.3 Surgical management

Surgical treatment was indicated because of persistent radial head dislocation associated with marked functional limitation of the elbow.

Through a posterior approach to the ulna, a transverse osteotomy was performed, followed by realignment of the ulna. This correction enabled indirect reduction of the radial head without the need to expose the dislocated joint.

The ulnar osteotomy was stabilized using a dynamic compression plate (DCP). Temporary humeroradial pin fixation was added to help maintain the achieved reduction (Figure 2).



Figure 2: Intraoperative views showing the transverse ulnar osteotomy (A), followed by ulnar realignment and DCP fixation, allowing indirect radial head reduction (B). Intraoperative lateral radiograph demonstrating radiocapitellar reduction and temporary humeroradial pin fixation (C).

2.4 Postoperative course and functional outcome

The pins were removed at four weeks postoperatively, allowing initiation of functional elbow rehabilitation.

At the three-month postoperative assessment, the clinical course was favorable, with full recovery of elbow flexion and extension and forearm pronation and supination (Figure 3).

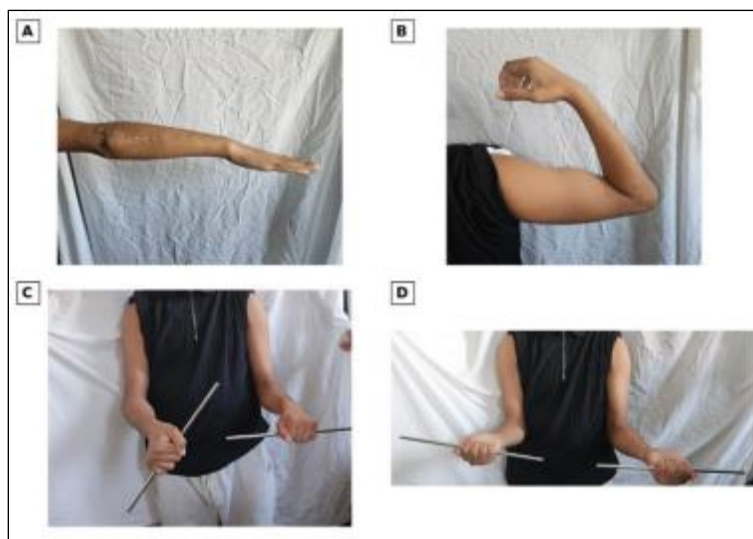


Figure 3: Clinical assessment at three months postoperatively illustrating recovery of elbow extension (A) and flexion (B), as well as restoration of forearm pronation and supination (C, D).

Follow-up radiographs confirmed union of the ulnar osteotomy, maintained radiocapitellar alignment, and the fixation hardware in place (Figure 4).



Figure 4: Anteroposterior (A) and lateral (B) radiographs of the right elbow at three months postoperatively, showing union of the ulnar osteotomy, maintained radiocapitellar alignment, and fixation hardware in situ.

3 DISCUSSION

The management of neglected Monteggia fracture-dislocations remains challenging, particularly in children and adolescents. Persistent radial head dislocation may lead to progressive restriction of joint motion, bony deformity, and morphological changes in the articular surfaces, ultimately compromising elbow function. Surgical treatment aims to restore radiocapitellar congruity, correct ulnar deformity, and preserve joint mobility [1,2].

In our case, the diagnosis had been established at the initial presentation, but interruption of medical follow-up resulted in a three-month delay in treatment. The patient had limited elbow flexion and complete loss of pronation and supination. The distinctive feature of this case was the achievement of indirect radial head reduction following transverse ulnar osteotomy and realignment, without surgical exposure of the joint.

Correction of ulnar deformity is a central component of treatment for neglected Monteggia injuries. By restoring ulnar alignment, osteotomy may facilitate restoration of radiocapitellar relationships. Hirayama et al. [3] described the value of ulnar osteotomy combining lengthening and angular correction in the treatment of chronic radial head dislocation in children. Subsequently, different techniques have been proposed, involving angular correction, ulnar lengthening, or direct radial head reduction, depending on the case [1,4]. In our patient, transverse osteotomy followed by simple ulnar realignment achieved satisfactory indirect reduction without deliberate lengthening or specific angular overcorrection.

The possibility of obtaining closed radial head reduction after ulnar correction is of particular interest in neglected injuries. Zivanovic et al. [1] reported cases in which radial head reduction was achieved without surgical exposure of the joint following ulnar osteotomy. Nevertheless, indirect reduction is not always feasible, particularly when anatomical obstacles or substantial periarticular changes are present. Cao et al. [5] evaluated open radial head reduction combined with corrective ulnar osteotomy in children with neglected Monteggia injuries. Their study illustrates the role of this approach when direct exposure is required to restore radiocapitellar congruity. In our case, reduction following ulnar realignment made an additional open procedure unnecessary.

The meta-analysis by Tan et al. [6], comprising 30 studies and 600 patients, found no significant difference in the final maintenance of radial head reduction between open and closed reduction. These findings suggest that surgical exposure of the joint is not invariably a determining factor in reconstructive success. However, the heterogeneity of the surgical techniques and patient populations warrants cautious interpretation. Surgical strategy should therefore be guided by the anatomical characteristics of the injury, radial head reducibility, and stability after ulnar correction.

Beyond reduction itself, maintenance of radiocapitellar stability is essential. The role of annular ligament reconstruction remains controversial, especially when ulnar correction provides satisfactory reduction. In their review, Gryson et al. [4] emphasized the diversity of therapeutic strategies and the lack of consensus regarding routine ligament reconstruction. No annular ligament reconstruction was performed in our patient. Temporary humeroradial pin fixation was added to help maintain reduction and was removed at four weeks postoperatively. The meta-analysis by Tan et al. [6] reported an association between the absence of transcapitellar pinning and better final maintenance of reduction. This association does not establish causality, as the indication for pinning may depend on the complexity of the injury.

and the initial stability of the reduction. In our patient, maintained radiocapitellar alignment at three months was a favorable finding, although the independent contribution of temporary pin fixation cannot be determined.

Patient age, duration of the untreated injury, and morphological changes in the joint are also important prognostic considerations. Wintges et al. [2] proposed a treatment algorithm that takes into account the chronicity of the injury and the degree of radial head deformity, emphasizing the role of reconstructive procedures when the articular surfaces still permit satisfactory restoration of radiocapitellar relationships. Stragier et al. [7] investigated the long-term outcomes of corrective ulnar osteotomy, highlighting the importance of prolonged functional and radiographic assessment. In our case, the three-month delay may have contributed to the feasibility of indirect reduction. However, without a detailed morphological assessment of the articular surfaces, this hypothesis cannot be confirmed. Similarly, our patient's age of 16 years distinguishes him from the younger children included in several series, but does not allow conclusions regarding the influence of skeletal maturity on the outcome.

The postoperative course was favorable, with radiographic union of the ulnar osteotomy, maintained radiocapitellar alignment, and complete recovery of elbow flexion-extension and forearm pronation-supination at three months. These findings are encouraging given the substantial preoperative functional limitation. Nevertheless, they should be interpreted cautiously because this is a single case with a short postoperative follow-up. Early recovery of motion does not guarantee long-term radiocapitellar stability or exclude late complications. Extended clinical and radiographic follow-up is therefore needed to assess the durability of reduction, preservation of joint motion, and possible development of degenerative changes.

Thus, our case illustrates the feasibility of indirect radial head reduction after transverse ulnar osteotomy and realignment in a Monteggia fracture-dislocation neglected for three months. This strategy may represent a therapeutic option in selected cases, without establishing superiority over techniques requiring open reduction.

4 CONCLUSION

The management of neglected Monteggia fracture-dislocations remains a therapeutic challenge, particularly in adolescents. Our case illustrates the feasibility of indirect radial head reduction through ulnar osteotomy and realignment, without surgical exposure of the joint. Radiographic union and complete recovery of joint motion at three months indicate a favorable early outcome. However, the feasibility of this technique depends on the characteristics of the injury and the reducibility of the radial head. Longer-term follow-up remains essential to assess the stability of reduction and the durability of functional recovery.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

Statement of informed consent

Written informed consent for publication of this case report and accompanying images was obtained from the patient's legal guardian, with the patient's assent.

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