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## A rare paediatric Monteggia equivalent lesion with posterior interosseous nerve injury – Case report and review of literature

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### Abstract

Monteggia equivalent injuries are uncommon and require meticulous clinic-radiological evaluation to diagnose. Neglect or under treatment of these injuries leads to suboptimal functional outcome. In most of the cases, these injuries require open reduction and fixation to ensure satisfactory reduction of fractures. Uneventful course of treatment leads to good union and functional outcome. The present case describes a rare occurrence of type- 1 Monteggia equivalent lesion successfully managed with good outcome.

**Keywords:** Injury, Elbow, Child, Trauma, Monteggia fracture, Management, Fixation.

### 1. Introduction

Monteggia fracture-dislocations are eponymous, complex and uncommon pattern of elbow injury in paediatric age named after Giovanni Batista Monteggia of Milan [1]. It is not uncommon to see missed or neglected injuries of this type leading to suboptimal function. A careful evaluation is warranted to not miss these fractures and reduce the burden of chronic Monteggia lesion, that is harder a challenge to treat [2, 3]. Bado classification of true Monteggia lesion has been widely used since its description [4]. There has been many addition to original classification leading to better understanding of Monteggia equivalent lesions. Bado type 1 equivalent lesions have various patterns. The fracture of radius and ulna with radius fracture above junction of middle and proximal third and proximal to that of ulna fracture has been one such injury. Posterior interosseous nerve (PIN), a branch of radial nerve is susceptible to injury in such fractures owing to its proximity to proximal radius [5]. This pattern of injury has very few reports due to its rarity. We describe one such case report successfully managed with good functional outcome.

### 2. Case Report

A seven year old child was brought by his parents to us with history of injury to his left forearm region the same day with complaints of pain and inability to use the affected limb. The affected forearm was held in a towel used as a sling. There was swelling present in the mid forearm region compared to the contra-lateral extremity. On palpation, tenderness and crepitus were noted in middle ulna and proximal radial region. The distal vascular status was intact but there were clinical features of associated posterior interosseous nerve injury in affected extremity in the form of inability to extend fingers at metacarpo-phalangeal joints. A provisional diagnosis of fracture both bone of forearm was made and radiographic confirmation was done. Radiographs showed a short oblique proximal radius fracture above the junction of middle and proximal third along with spiral comminuted ulna fracture distal to the level of radius fracture. (Fig.1) this was a rare form of Monteggia lesion and adequate management was planned for anatomical reduction of fractures with operative intervention. An informed consent was taken from parents for further proposed management as well as future publication of the report.



**Fig 1:** Radiograph of the injury with ulna and radius fracture (radius fracture proximal to ulna one- Monteggia equivalent injury).

Open reduction of ulna fracture was followed by intramedullary titanium elastic nail, while radius fracture was managed in same way by closed reduction under image intensifier. The operation followed a protection plaster splint. The wound healed uneventfully and plaster was removed after ten days to initiate physiotherapy. The fracture showed gradual union on follow up at 6 and 12 weeks. (Fig.2) The implants were removed after six month once the fracture united.



**Fig 2:** Post-operative radiograph showing fixation with intramedullary titanium nails (up) and uniting fracture at follow up (below).

### 3. Result

Final follow up at one year showed excellent clinical and functional result with good range of motion and united fracture. (Fig.3) The child was pain free and performing activities of daily living with no complication related to fracture or surgery. The associated nerve injury resolved on its own with no clinical problem or need for further treatment.



**Fig 3:** Healed fracture at final follow up.

### 4. Discussion

Type 1 Monteggia equivalent lesion has been reported very rarely in literature and has been associated with need for operative fixation and poorer outcome.<sup>6</sup> Direct trauma, hyperpronation or hyperextension have been cited as probable mechanism of injuries in type 1 fractures. Our case had a history of fall on outstretched hand with exact mechanism could not be ascertained through history. Hyperextension seems plausible explanation with failure of both forearm bones. Radial head dislocation that is seen in classical Monteggia fracture was not present, the possible relocation of subluxated radial head however cannot be overruled. These injuries require proper restoration of length, angulation and rotation while fracture unites. The minimal invasive surgery and fixation ensures easy and effective intervention. The short oblique or spiral fracture geometry or associated radius fracture is better managed surgically. Besides it, failure to reduce ulna fracture or reduce radial head is also an indication of surgical intervention. Ulna fracture should be reduced well in order to reduce radial head in classical lesion but our case required both fractures to be reduced satisfactorily<sup>16, 71</sup>. Intramedullary fixation is most commonly used with few exceptional cases when plate and screw implants are preferred. Associated PIN injuries have been reported to resolve well in children<sup>18</sup>. The radial head dislocation in classical Monteggia fracture is related to probable nerve injury due to anatomical relation and proximity of radial nerve to radial head and neck. Our case had no evident radial head dislocation and PIN injury in these settings is uncommon. However, there was complete resolution of nerve injury by three months in our case. This is in accordance with multiple literature that indicate complete resolution of nerve related features in most instances with expectant treatment<sup>19</sup>.

### 5. Conclusion

Appropriate management of forearm fractures is key to optimum function. The knowledge of rare injury patterns helps in diagnosis and management of such injuries so that are not neglected. Standard care involves anatomic reduction and early physiotherapy with careful follow up for any future complications.

### 6. Acknowledgement

None.

## 7. Conflict of interest

None.

## 8. References

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