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Complex Elbow Trauma in Children: A Rare Case of Posteromedial Dislocation Elbow with Fracture Lateral Humeral Condyle

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Abstract- Concomitant fracture of lateral humeral condylar physis along with dislocation of the elbow is a rare entity. There is a paucity of literature on the topic with previous citation being isolated case reports or case series of 3-4 cases. Inasmuch as the treatment of lateral condyle is open reduction internal fixation, it is imperative that standard protocols are followed in order to expect a good outcome. We report a case of 11 year old male child with such an injury who was managed with operative intervention followed by excellent outcome. Subsequently we wish further add upon the existing limited knowledge on the management of this complex injury pattern.

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I. INTRODUCTION

Isolated traumatic dislocation of the elbow in children is a rare injury constituting 3–6% of all elbow injuries.^{1,2} Elbow dislocations are usually posterior or posterolateral³ and they may be associated with fractures like medial epicondyle, coronoid process, radial head and olecranon. Posteromedial dislocation of the paediatric elbow is per se very rare and on top of that their association with a lateral humeral condyle fracture is extremely rare.^{4,5} We are presenting one such rare case.

II. CASE PRESENTATION

An 11 year old male child presented to us with a history of injury to his right elbow after fall from bicycle on an outstretched hand. On examination there was diffuse swelling present around the elbow along with deformity with marked tenderness over the lateral condyle without any distal neurovascular deficit. The anteroposterior and lateral radiographs showed

posteromedial dislocation of elbow with fracture of the lateral condyle of humerus (Figure 1 and Figure 2).

Closed reduction of the elbow was performed under intravenous conscious sedation and analgesia. Post reduction radiographs showed Milch type II fracture of humeral condyle (Figure 3 and 4).

Informed consent was taken from the parents and patient was taken up for surgery. Under general anesthesia elbow was closed reduced and found to be stable throughout range of motion. A standard lateral approach for elbow was used to access the fracture site, reduced under vision and fixed with two smooth K wires. Furthermore, again the elbow was found to be stable. A plaster of Paris above elbow slab was applied. Post-operative period was uneventful.

III. RESULTS

Postoperative radiographs (figure 5 and 6) showed anatomical reduction with a congruent joint. Wound healed well and sutures were removed after 2 weeks. Serial x-rays showed expected fracture healing and elbow range of motion started after removal of K wire at 6 weeks. Patient showed good recovery and at 10 month follow up (figure 7) patient has a mayo elbow score of 100 and excellent outcome with a stable elbow. Furthermore no complication was observed.

IV. DISCUSSION

In children, elbow dislocation is not very common with peak incidence in the adolescent age group. It is usually classified based on the direction of displacement. Although their association with medial epicondyle fracture is well known which can sometimes be incarcerated in the joint, their concomitant incidence with #lateral condyle is a very rare occurrence.^{2,5,6,12,13}

Fractures of the lateral condylar physis constitute 16.9% of distal humeral fractures.¹⁴ Fractures involving the lateral condylar physis occur early, with the average age around 6 years which can fracture both by pull and push-off mechanism after fall on outstretched hand.^{15,16}

Fracture of the lateral condylar physis is usually classified by Milch classification system and

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displacement stages are divided into three parts. Our patient had Milch type 2 fracture pattern with stage 3 of displacement which is in concert with reportings in most of the previous studies. This is an easily discernible fact since the lateral crista support is lost in Milch type 2 fracture patterns allowing for dislocation. However some have reported Milch type 1 fracture patterns also in this type of injury.^{17,18}

As was described by Morrey in his study that primarily a varus force causes such a complex injury where body is falling over the elbow medially as compared from laterally.¹⁹ The position of the forearm has been widely advocated as supinated with fracture occurring due to pull of the long extensor muscles of the forearm.²⁰

Here one may argue that in a lateral condyle Milch type 2 which is an unstable configuration distal part is likely to displace laterally as was originally described by late Dr Henry Milch (figure 8) and later in many studies.^{12,21}

The displacement in this rare complex injury has been characteristically described as posteromedial in previous reports^{4,22,23,24} as was the case in our patient. Furthermore newer studies are indicating towards a concomitant injury in up to three-fourth of the cases.²⁵

Alignment between the radial head and capitellum is an important guideline for diagnosing different types of elbow injuries in children. Displaced fracture of lateral condyle will misalign this relationship and so will a dislocation, however not so much in injuries occurring superior to the elbow joint.^{26,27} In our case the alignment was maintained which was attributed to the intact lateral collateral ligament as was found per-operatively. Similar findings have been reported in previous studies also.²⁸

Fixation of displaced lateral condyle fractures is standard protocol to avoid late complications notably the non-union, osteonecrosis of trochlea and angular deformities.⁹ Most studies have reported management protocol as prompt closed reduction which was done immediately following xrays under conscious sedation and analgesia. This is followed by open reduction and internal fixation with smooth k wires since it is a Salter-Harris type 4 injury and has shown excellent result in the past.^{4,29,30,31} A good reduction under vision and a stable elbow are likely to give satisfactory results.

V. CONCLUSION

The posteromedial dislocation of the elbow associated with fracture of the lateral humeral condyle is a rare injury and is not difficult to treat. A good concentric reduction of dislocation and good fixation of lateral condyle fracture is mainstay of the treatment of these injuries in isolation or in combination. The knowledge of probable associated injuries helps in

anticipation and detection leading to optimal management.

Ethical issues

Informed consent taken for surgery and future publication.

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Figure 1 and 2: Pre-operative radiograph showing #lateral condyle humerus with posteromedial dislocation



Figure 3 and 4: x-rays after closed reduction



Figure 5 and 6: x-rays showing fixation of lateral condyle humerus with 2 k-wires

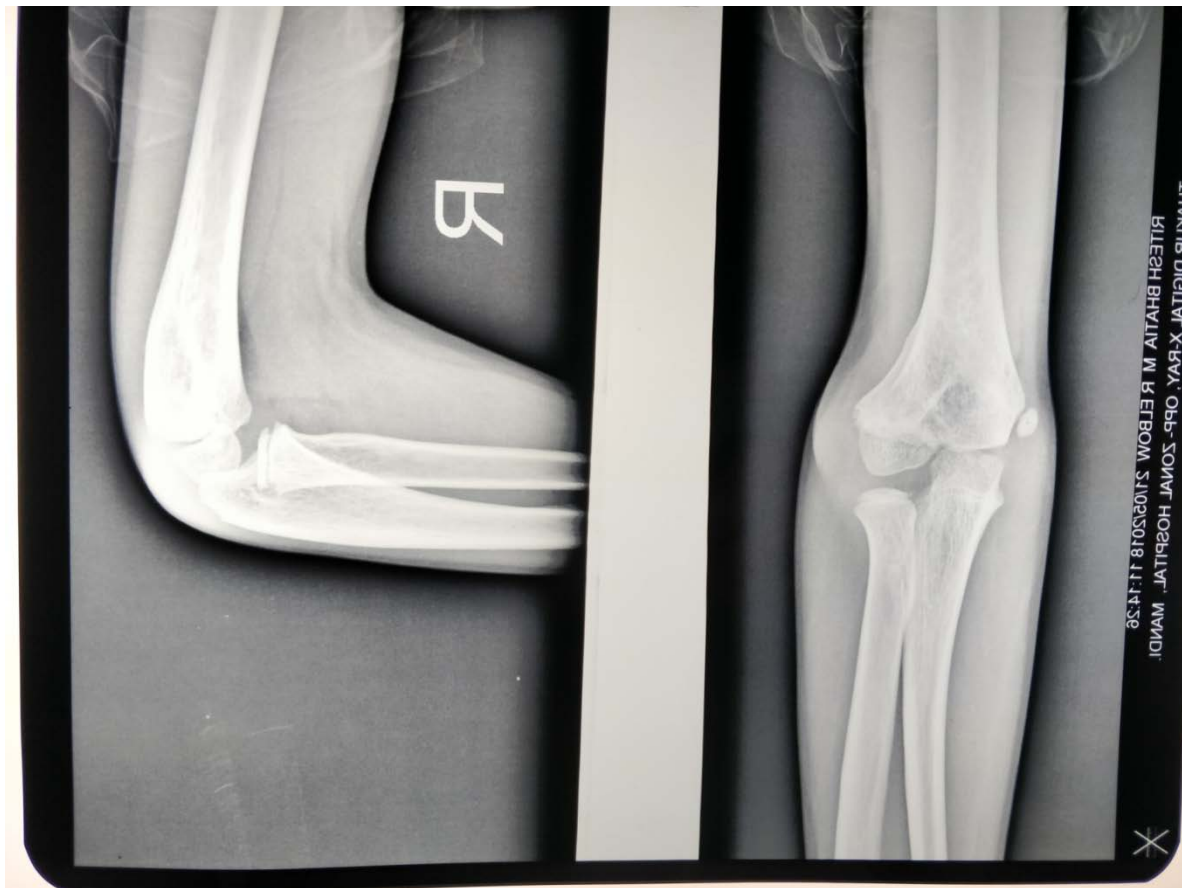


Figure 7: Radiographs at final follow up

Milch classification

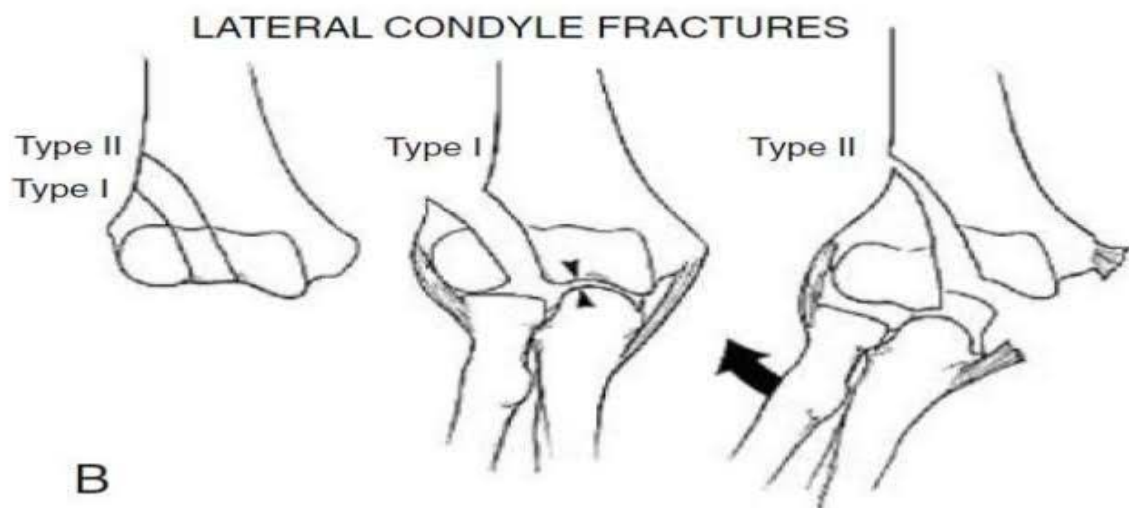


Figure 8: Milch classification