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Case Report

Complex paediatric fracture dislocation of the elbow - A rare case report

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ABSTRACT

Traumatic elbow dislocation with concomitant fractures of the lateral condyle and the medial epicondyle in the paediatric population is an extremely rare injury. We are reporting a case of a locked fracture-dislocation of the elbow in an 11-year-old girl. The dislocation was treated by open reduction and the lateral condyle was surgically fixed. There are only seven similar cases described in the literature. This is the only reported case where the elbow dislocation was locked, requiring an open reduction.

Introduction

Isolated traumatic dislocation of the elbow in children is a rare injury, comprising 3–6% of all elbow injuries in children and the majority (95%) are posterior dislocations [1]. The majority (64 to 75%) of traumatic elbow dislocations in the paediatric population are associated with peri-articular fractures [2]. Medial epicondyle fractures are the most commonly associated fractures with elbow dislocation [3]. Lateral condylar mass fractures are the second most common distal humeral injuries after supracondylar fractures [4] in children and they are rarely associated with elbow dislocation. Concomitant medial epicondyle and lateral condylar mass fracture with dislocation of the elbow is extremely rare. Presentation of a locked elbow dislocation with these fractures requiring open reduction of the dislocation has never been reported before. We describe one such case in this report.

Case presentation

An 11-year-old girl presented with a deformed and grossly swollen right elbow after a fall on the outstretched arm while performing gymnastics. Radiographs demonstrated a postero-lateral dislocation of the elbow joint with fractured lateral condylar mass. Neuro-vascular function in her right upper limb was intact. An attempted closed reduction in the Emergency Department under sedation was unsuccessful. A CT scan demonstrated postero-lateral dislocation with concomitant fractures of the lateral condylar mass and a displaced medial epicondyle fracture, which was trapped inside the elbow joint (Figs. 1–5).

Further attempts at closed reduction under general anaesthetic in the operating theatre were unsuccessful. A standard lateral approach to the elbow joint was made to achieve control over the lateral condylar mass, which was initially displaced to visualise the joint and evacuate the interposing medial epicondyle. This allowed reduction of the elbow joint and indirect anatomical reduction of the medial epicondyle. The lateral condylar mass was subsequently reduced and fixed anatomically with two smooth 1.6 mm K-wires under fluoroscopic guidance, stabilising the elbow joint. The reduction & stability of the medial epicondyle and the elbow joint was

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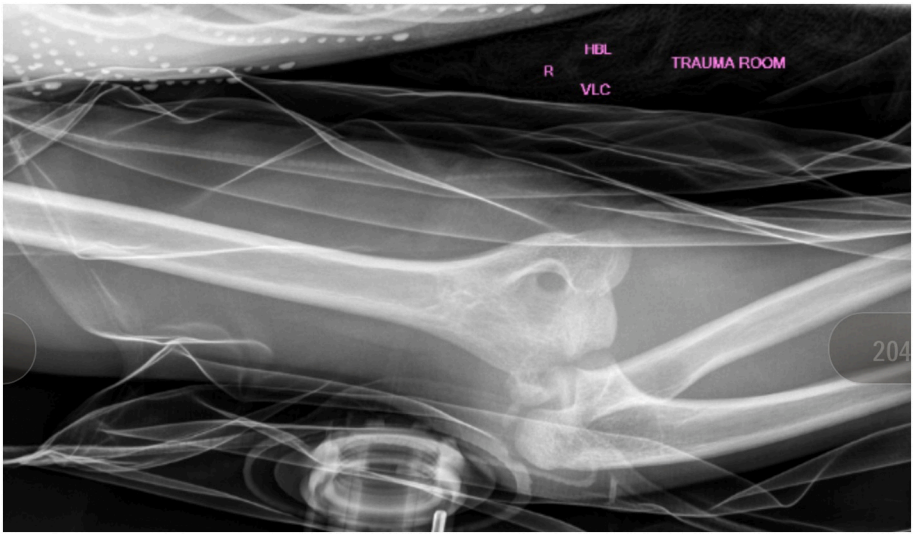

Fig. 1. Radiograph at the time of presentation.

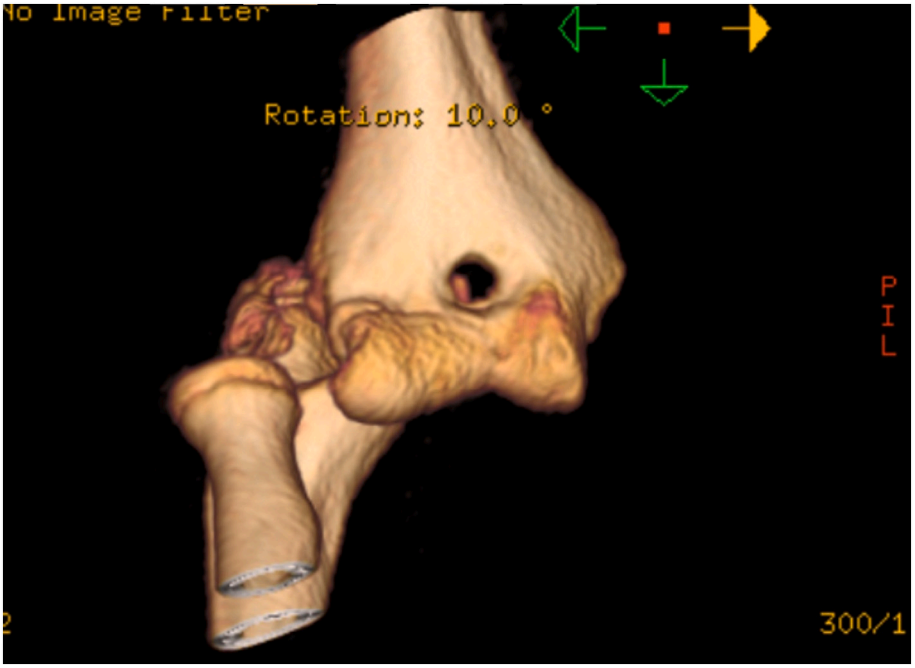

Fig. 2. CT scan – 3D reconstruction - coronal view - AP.

assessed under fluoroscopic imaging. Imaging confirmed a stable anatomical reduction of the medial epicondyle, thereby surgical fixation was not deemed necessary. The K-wires were cut and left exposed outside the surgical wound. The arm was splinted in a plaster slab (Figs. 6–8).

The patient was followed up in the fracture clinic with subsequent radiographs and CT scans. Clinical and radiological examinations demonstrated satisfactory anatomical reduction and stable configuration of the elbow joint. The K-wires were removed after four and half weeks under general anaesthesia. At the first post-operative follow up it was observed that the elbow joint movement was restricted with a small arc of movement. This improved over the next few weeks with physiotherapy. Three months after the injury, the patient regained full range of flexion and was lacking only the last 15 degrees of extension. Radiographs at three months demonstrated excellent bony union of the medial epicondyle and the lateral condylar mass (Figs. 9–10).

The patient was reviewed in the outpatient clinic after 12 months. Radiographs at 12 months demonstrated excellent remodelling of the distal Humerus. The patient regained almost full extension lacking only the last three degrees with symmetrical carrying angle

Fig. 3. CT scan 3D reconstruction - sagittal view.

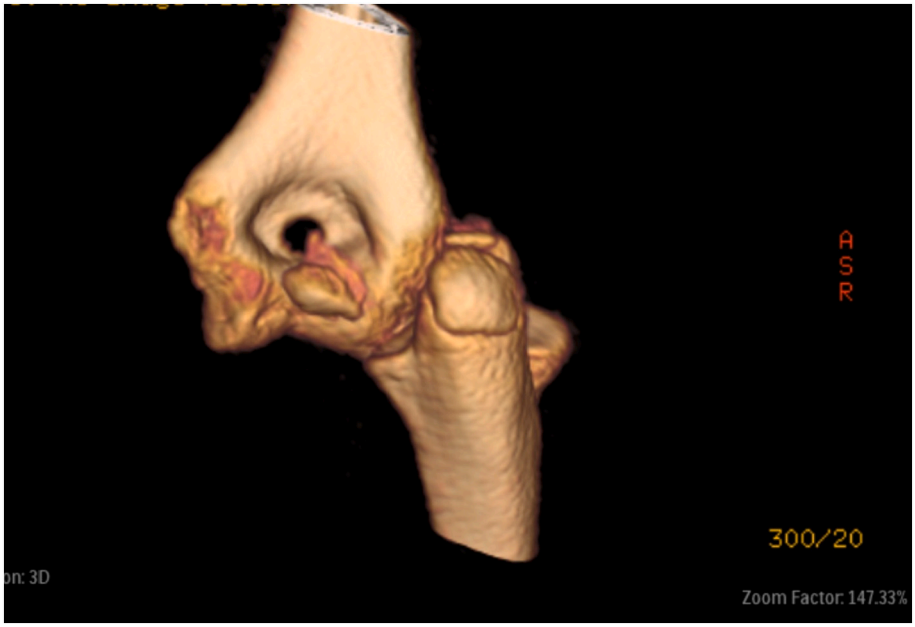

Fig. 4. CT scan 3D reconstruction - coronal view -PA.

and all functions restored (Figs. 11–12).

Discussion

Concomitant fractures of the lateral condylar mass and medial epicondyle with traumatic elbow dislocation are rarely described in the literature. Sharma et al. have reported the largest series of three such injuries in the paediatric population [4]. Two of these were treated conservatively and one was fixed with K-wires.

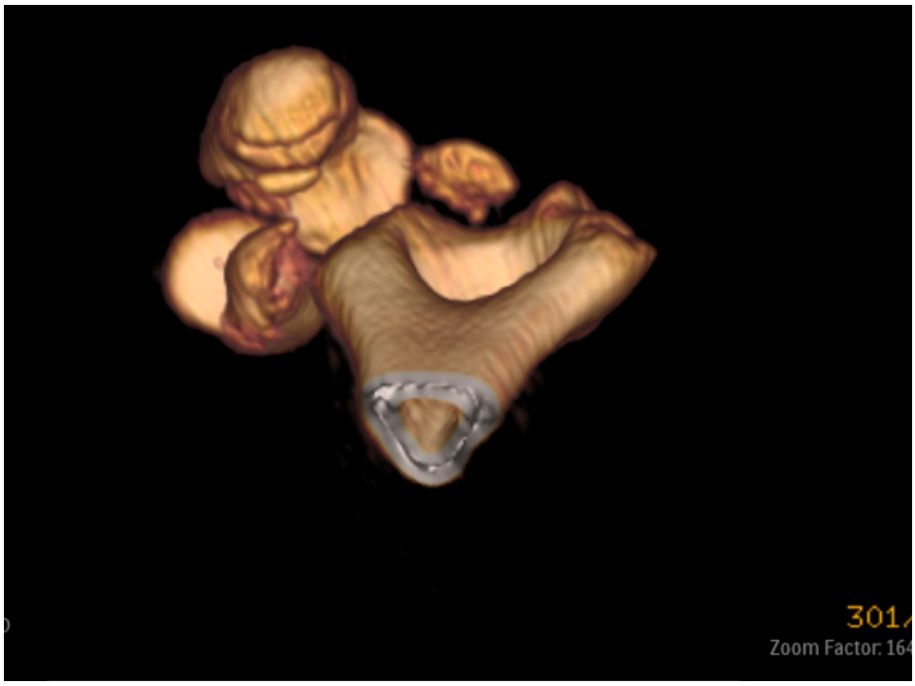

Fig. 5. CT scan 3D reconstruction - axial view.

Fig. 6. Intra-operative photograph of lateral approach to the elbow joint - showing the lateral condyle fracture.

Rasool et al. [2] have reported a large series of 33 acute elbow dislocations in children out of which there was only 1 reported case of the concomitant medial epicondyle and lateral condyle fracture. They also observed that 72% of these dislocations were associated with peri-articular fractures of some description.

Abu-jayyab et al. have reported 1 case of lateral condyle with medial epicondyle fracture-dislocation of the elbow with transection of the Radial nerve [5]. It is the only reported case found in the literature with this combination of injuries.

Fig. 7. Intra-operative radiograph.

Fig. 8. Intra-operative radiograph.

One similar case has been reported by Gangadharan et al. describing Milch Type 1 injury of the lateral condyle and incarcerated medial epicondyle fracture. They surgically fixed both structures; fixing the medial side first.

There is a single case report in French by Hachri et al. [6] describing traumatic elbow dislocation with fractures of both epicondyles in a 13-year-old child. The medial epicondyle was fixed with K-wires and the lateral epicondyle was treated conservatively.

These are the only seven cases found in the literature describing this particular combination of injuries. None of the previous cases

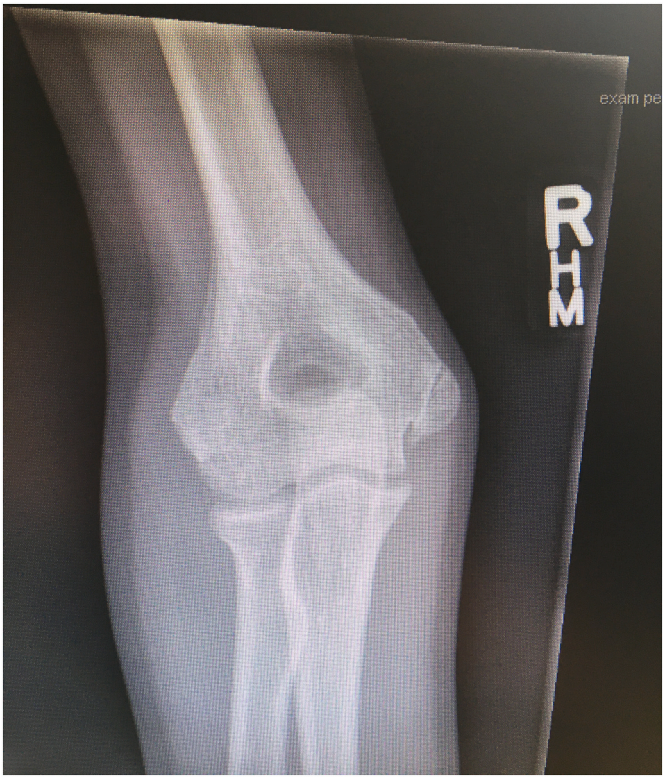

Fig. 9. Radiograph after 3 months - AP view.

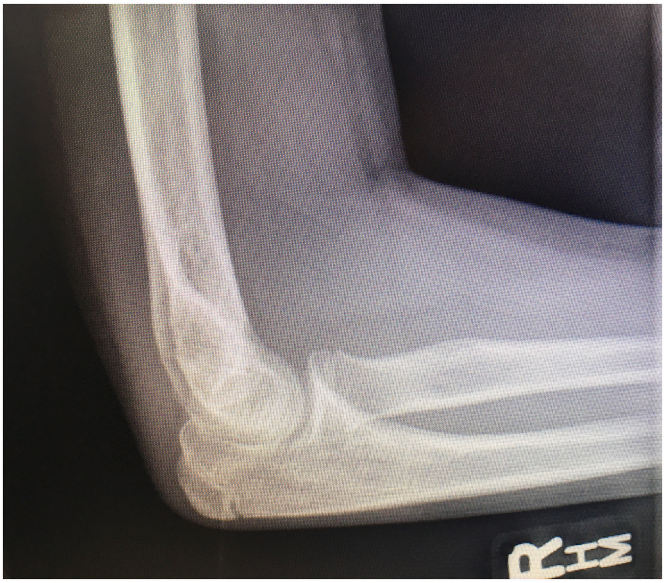

Fig. 10. Radiograph after 3 months - lateral view.

Fig. 11. Radiograph after 12 months - AP view.

presented with a locked elbow requiring open reduction of the dislocation. In this context our reported case is unique.

There is paucity in the literature about the management principles of this injury. It is difficult to find any consensus about surgical techniques or decision regarding the fixation of structures. In the absence of absolute surgical indication, non-operative management of medial epicondyle fractures are found to be satisfactory in a large systematic review [7]. In our report, we have demonstrated that healing of the medial epicondyle was satisfactory after successful indirect reduction. It is not certain whether an impaction force or an avulsion force causes greater instability in the fracture-dislocation of the elbow joint [8]. The lateral condyle fracture in our case was the result of an impaction force and surgical fixation contributed greatly to the stability of the joint.

Conclusion

We have described a unique fracture-dislocation of the elbow joint in an 11-year-old girl. We sincerely hope to contribute to an improved understanding of this rare injury pattern.

CRediT authorship contribution statement

Author 1. Mr Suddhajit Sen- Conceptualization, Investigation, Writing-original draft, Writing- review and editing- corresponding author.

Author 2. Mr Udayi DeSilva- Review and editing, help in clinical follow up

Author 3. Mr John Crerand- Supervision, review and editing.

Fig. 12. Radiograph after 12 months - lateral view.

Declaration of competing interest

The authors declare that they have no conflicts of interest.

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