



Case report

Anterior trans-olecranial dislocation of the elbow in children: A case report of an unusual form of elbow dislocation and review of literature

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1. Introduction

Elbow dislocation is a rare condition in the pediatric setting with an estimated prevalence between 3 and 6% of all elbow injuries [1]. Trans-olecranial anterior dislocations are even less common [2,3]. We report a case of anterior dislocation of the elbow associated with a fractured olecranon in a 6-year-old patient treated surgically with a good final result.

2. Methods

This case report is written in compliance with the SCARE 2020 guidelines [4].

3. Case presentation

3.1. Patient information

We report the case of a 6 years old male patient, with no previous personal and family medical or surgical history, who was a victim of a domestic accident: fall from a 1 m height landing on the left upper limb. The patient was brought by his parents to the emergency room on the same day with a main complaint of a painful deformed left elbow.

3.2. Clinical finding

Clinical examination showed swelling and diffuse tenderness over the left elbow. The elbow bony prominences were not palpable. The skin was intact and there were no associated neuro-vascular complications in the left upper limb.

3.3. Diagnostic assessment

X ray antero-posterior and lateral views of the left elbow showed an anterior dislocation of the left elbow with associated proximal olecranon fracture (Fig. 1). The diagnosis of an anterior trans-olecranial dislocation of the elbow was made.

3.4. Timeline

The patient was immobilized in a long arm plaster splint, and immediately admitted to the orthopedic ward and kept nil per month for surgery.

3.5. Therapeutic intervention

The child was taken to the operating room at 6 h after the injury. The procedure was done by two senior registrars in orthopedic surgery. A tourniquet at the root of the left upper limb was used and inflated to 180 mmHg.

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Fig. 1. Standard X-ray of the left elbow in antero-posterior and lateral views showing an anterior dislocation of the left elbow associated with an olecranon epiphyseal detachment.

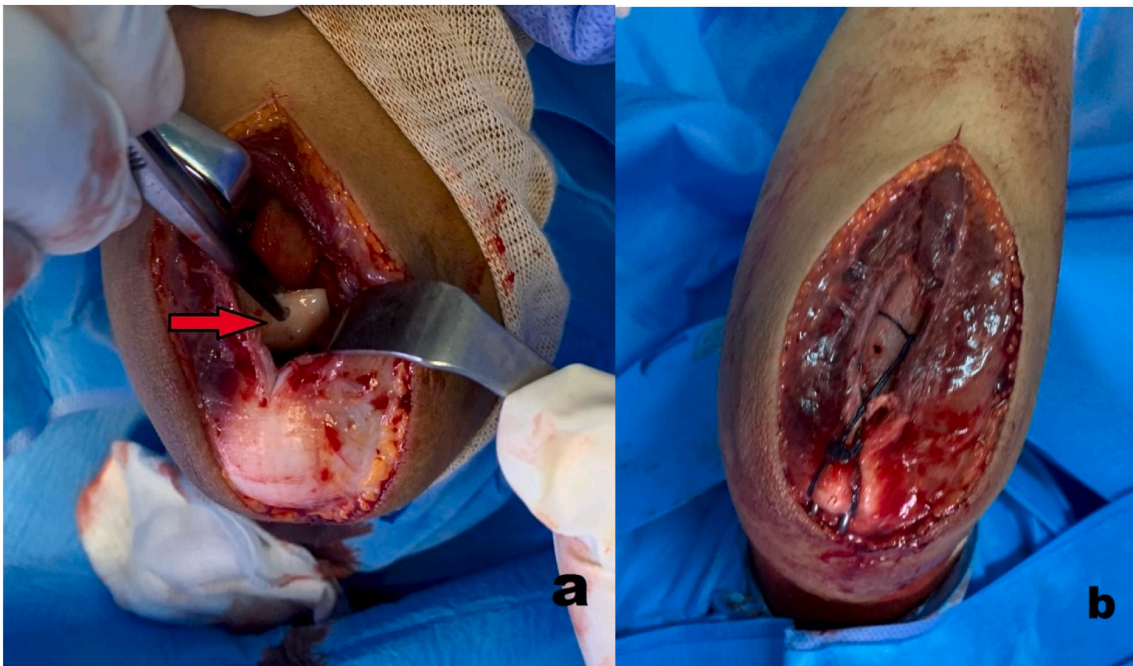


Fig. 2. Peroperative exploration (a) showing an incarceration of the periosteum in the sigmoid cavity (red arrow). Osteosynthesis is performed by a tension band wiring technique after dislodging the periosteum and reduction (b). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Under general anesthesia, the first attempt of a closed reduction failed. The child was then move to the lateral position. An open reduction through a posterior approach is attempted. The periosteum was found to be incarcerated in the sigmoid fossa preventing any reduction (Fig. 2). After removal of the trapped periosteum, the dislocation was reduced. The olecranon was fixed with a tension band wiring technique using absorbable Novosyn® 1 threads (Bran Surgery, Spain) (Fig. 2). Per

operative scopic views confirmed the good reduction and the accuracy of the olecranon fracture fixation. The testing showed a stable elbow. Skin closure was done on a suction drain. The upper left limb was immobilized in a long arm plaster splint.

On day two post operatively, the drain was removed and a control x ray showed an acceptable reduction (Fig. 3). The child was then discharged home.



Fig. 3. Postoperative X-ray shows a perfect reduction of both the fracture and the dislocation.

3.6. Follow-up and outcomes

An outpatient follow-up was made at 3 weeks; 6 weeks; 3 months; 6 months and one year. The splint was removed at 6 weeks post operatively. The pin removal was done 3 months after the surgery and active elbow range of motion was encouraged.

At 12-month follow-up, the elbow had regained active flexion at 130°, with a flexion contracture of 15° and full pronosupination (Fig. 4). The patient resumed his normal daily living. The last follow-up X-ray, at one year post-operatively, showed a good humero-ulnar and humero-radial joint. No heterotopic calcifications were seen (Fig. 5).

4. Discussion

Elbow dislocation is the most common type of dislocation in children and accounts for 3% of all elbow injuries [5]. It is posterior in the majority of cases.

An associated fracture is found in 50 to 75% of the cases [6,7]. It is essentially an avulsion fracture of the medial epicondyle.

Trans-olecranon anterior dislocation is the least common type, in the series by Yousri et al. [4] that reports 144 cases of elbow dislocation, only one was described. To the best of our knowledge, only 12 cases of trans-olecranon fracture variants have been reported in the English literature [8].

While the anterior trans-olecranon fracture dislocation pattern is well described in adults, this injury has been rarely reported in children. Therefore, there are few data regarding the optimum treatment and outcome [9].

Tiemdjo et al. [10] proposed a classification that distinguishes 4 types:

Type I corresponds to epiphyseal detachments which occur very often in small children with an immature skeleton. It is a very proximal fracture of the olecranon with or without continuity of the periosteum. Type II corresponds to transversal fractures of the olecranon. Type III is a group of oblique fractures of the olecranon. They are mainly seen in older children. Type IV refers to olecranon fracture associated either to a humerus or a radius fracture. Our case is a type I according to this classification.

The anterior trans-olecranon fracture dislocation represents an

extremely uncommon injury pattern, presenting as a potentially serious fracture-dislocation of the elbow, with a high risk of neurovascular compromise [11]. For this reason, all the cases including ours were considered as a therapeutic emergency. The management was done few hours after the injury.

In most of the cases reported in the literature, the treatment consists in an open reduction and internal fixation. Loup [12] obtained excellent results using intramedullary cancellous bone screw associated with a screw plate. Guitton et al. [13] also achieved excellent results using a screw plate synthesis. They reported only one case that needed revision surgery, where a brace was replaced by a screwed plate with an excellent final result. They concluded that brace synthesis is not suitable for trans-olecranon anterior dislocations in children.

Most of authors advocate open reduction and internal fixation, however closed reduction when possible, yielded excellent results as stated by Tiemdoj et al. [10]. Internal fixation was not necessary in the case reported by Bouaziz et al. [14] where after open reduction the elbow was found to be stable and no fixation for the olecranon was used with only a stabilization with a long arm splint.

In our case, we think that orthopedic treatment could have been an option if the posterior periosteum was intact. Unfortunately, the incarcerated periosteum prevented us from reducing the dislocation rendering open reduction compulsory.

Table 1 summarizes the different types of dislocations found in the literature and their management.

Therefore, surgery is needed in case of instability, associated displaced fracture or neurovascular damage [15,16].

Likewise all injuries around the elbow in children, accurate reduction is very important because of the little remodeling. Misdiagnosed or maltreated, anterior transolecranon dislocations of the elbow can cause an important functional impairment in a growing child.

5. Conclusion

Trans-olecranon anterior dislocation must be identified and well known in children. It represents a real therapeutic emergency. Surgical treatment is necessary in case of irreducible dislocation or unstable elbow.



Fig. 4. The clinical result at the last follow up.

Patient perspective

Not applicable (young patient and unable to express opinion regarding surgery).

Source of funding

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical approval

The study is exempt from ethical approval in our institution.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Author contribution

Jlidi M and Bouaicha wrote the abstract, the case presentation and the discussion. Sbaihi S interprets the iconographies. Lamouchi M and Zaier A do the literature search. Daas S checks the work and approves it.

Research registration

Not applicable.

Guarantor

Daas S is the guarantor of this work. Daas S and Jlidi M are responsible for this work.

Declaration of competing interest

The authors declare that they have no conflicts of interest in relation to this article.

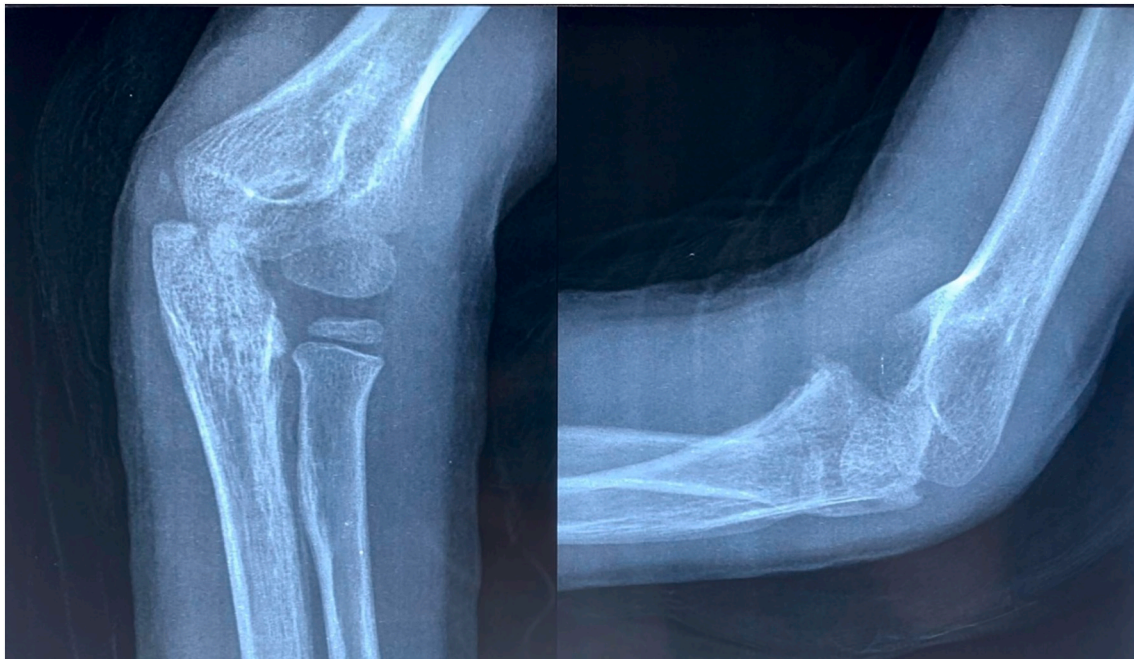


Fig. 5. Standard X rays at the last follow up show a lean callus after removal of the pins without peri-articular ossifications.

Table 1

Summary of the cases reported in the litterature.

Author	Number of cases	Sex	Age (years)	Olecranon fracture	Reduction	Type of osteosynthesis	Revision surgery	Complications	Results
Rasool [7]	1 case	?	<13	Detachment	Open reduction	Pinning	–	–	Excellent
Tiemdjo [10]	1 case	M	9	Cortico-periosteal detachment	Closed reduction	Long arm plaster splint	–	–	Excellent
Loup [12]	1 case	M	17	Oblique fracture	Open reduction	Cancellous bone screw Screw plate	–	–	Excellent
Guitton [13]	4 cases	M	11 (8–13)	Oblique fracture	Open reduction	Screw plate: 3 cases Brace on screw: 1 case	–	–	Excellent
Batrheja [16]	1 case	F	5		Open reduction	Bracing using steel wire	–	–	Excellent
Bouaziz [14]	1 case	M	7	Detachment	Open reduction	Long arm plaster splint	–	–	Excellent
Miravete-Galvez [11]	1 case	M	4	Detachment	Closed reduction	Percutaneous kirchner wire	–	–	Quick Dash = 4,54
Yamaura [8]	1 case	M	7	Cortico-periosteal detachment	Percutaneous reduction	Percutaneous pinning fixation	–	–	Elbow motion: 0° to 120°
Our case	1 case	M	6	Detachment	Open reduction	Tensin Bracing technique using absorbable threads	–	–	Range of motion: 0° to 140° Excellent

M: male, F: female.

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