

## ANTERIOR ELBOW FRACTURE DISLOCATION WITH ULNAR NERVE PALSY IN A SIX-YEAR-OLD CHILD

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■ For citation: Ashar NAK, Liew SK, Azmi NS, et al. Anterior elbow fracture dislocation with ulnar nerve palsy in a six-year-old child. *Pediatric Traumatology, Orthopaedics and Reconstructive Surgery*. 2020;8(2):207-212. <https://doi.org/10.17816/PTORS17721>

Received: 21.11.2019

Revised: 04.02.2020

Accepted: 08.06.2020

**Background.** Anterior elbow fracture dislocation is rare, especially in paediatric age group. Of the reported cases to date, three-quarter were posterior dislocation of the elbow. Anterior elbow dislocation is rarely reported, with incidence of only <2%.

**Clinical case.** A 6-year-old girl presented to casualty with left elbow deformity and pain after she tripped and fell in the toilet. Ulnar clawing was present with reduced sensation over ulnar nerve distribution. No wound was found, distal pulses and circulation were good. The X-rays showed anterior dislocation of the left elbow with olecranon fracture. Closed manual reduction was attempted but failed. Open reduction and percutaneous K-wire insertion under general anaesthesia was performed. Medial approach of the elbow was done. Intra-operatively ulnar nerve was found impinged by the distal ulnar fragment but was in continuity. The transverse olecranon fracture was fixed with two K-wires and the radial head was reduced. Ulnar nerve was mobilised until tension-free. Ulnar collateral ligament was repaired. The elbow was immobilised with a splint. Ulnar claw was resolved at 2 weeks. The fracture heals and the K-wires were removed at 6 weeks. At 8 weeks, range of movement of the elbow was full. The elbow was stable in varus and valgus.

**Discussion.** Anterior elbow dislocation is a high energy trauma and one should be cautious of neurovascular injury. There was no clear recommendation in the literature regarding surgical approach. We chose medial approach of the elbow for ulnar nerve exploration and olecranon fixation.

**Conclusion.** This rare injury should be treated with high index of suspicion. Surgical approach should be tailored individually according to the instability of the elbow joint and neurovascular status, as in this case was the posteromedial instability associated with ulnar nerve palsy.

**Keywords:** clinical case; fracture dislocation; ulnar neuropathies.

## ПЕРЕДНИЙ ПЕРЕЛОМОВЫВИХ В ЛОКТЕВОМ СУСТАВЕ С ПАРАЛИЧОМ ЛОКТЕВОГО НЕРВА У РЕБЕНКА 6 ЛЕТ

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■ Для цитирования: Ашар Н.А.К., Лиев С.К., Азми Н.С., и др. Передний переломовывих в локтевом суставе с параличом локтевого нерва у ребенка 6 лет // Ортопедия, травматология и восстановительная хирургия детского возраста. – 2020. – Т. 8. – Вып. 2. – С. 207–212. <https://doi.org/10.17816/PTORS17721>

Поступила: 21.11.2019

Одобрена: 04.02.2020

Принята: 08.06.2020

**Обоснование.** Передний переломовывих в локтевом суставе встречается редко, особенно у детей. Из всех представленных в литературе клинических случаев задние переломовывихи в локтевом суставе составили 75 %. Описание случаев передних вывихов в локтевом суставе публикуют редко, их частота составляет менее 2 %.

**Клиническое наблюдение.** Девочка 6 лет поступила в отделение скорой помощи с деформацией в области локтевого сустава и болью после того, как она споткнулась и упала в туалете. Отмечены симптом «когтеобразной кисти» и снижение чувствительности по ходу локтевого нерва. Рана отсутствовала, пульсация сосудов и кровообращение дистальнее повреждения были хорошими. На рентгенограмме выявлен передний вывих в левом локтевом суставе с переломом локтевого отростка. Попытка закрытого устранения вывиха была unsuccessful. Под общей анестезией проведено открытое устранение вывиха с чрескожной фиксацией спицей Киршнера. Использован медиальный доступ к локтевому суставу. Интраоперационно обнаружено, что локтевой нерв был ущемлен дистальным фрагментом локтевой кости, но целостность нерва была сохранена. Поперечный перелом локтевого отростка фиксирован двумя спицами Киршнера, выполнена репозиция головки лучевой кости. Осуществлена мобилизация лучевого нерва до исчезновения натяжения. Восстановлена локтевая коллатеральная связка. Локтевой сустав иммобилизован с помощью лонгеты. Симптом «когтеобразной кисти» исчез через 2 нед. Перелом зажил, и спицы Киршнера были удалены через 6 нед. Через 8 нед движения в локтевом суставе восстановились в полном объеме. Локтевой сустав был стабилен при варусном и вальгусном стресс-тестах.

**Обсуждение.** Передний переломовывих в локтевом суставе относится к высокоэнергетическим травмам, поэтому необходимо помнить о возможности повреждения нервов и сосудов. В литературе отсутствуют четкие рекомендации относительно оперативного доступа. Для ревизии локтевого нерва и фиксации локтевого отростка мы выбрали медиальный доступ.

**Заключение.** К лечению этого редкого повреждения необходимо подходить с крайней осторожностью. Хирургический доступ необходимо выбирать с учетом нестабильности локтевого сустава и состояния сосудисто-нервных структур. Так, в описанном случае наблюдалась заднемедиальная нестабильность с параличом локтевого нерва.

**Ключевые слова:** клинический случай; переломовывих; нейропатия локтевого нерва.

Traumatic elbow dislocation in children is rare, accounting for only 3–6% of paediatric elbow injuries [1]. Commonly, it is accompanied by concomitant fractures even though isolated dislocations have been reported. Of the reported cases to date, three-quarter were posterior dislocation of the elbow. Other subtypes which were less common include anterior, medial, lateral, convergent, and divergent dislocations [2]. There were limited studies reported on paediatric elbow dislocation, which of most were case reports with rare type of dislocations and complications. Anterior elbow dislocation is rarely reported, with incidence

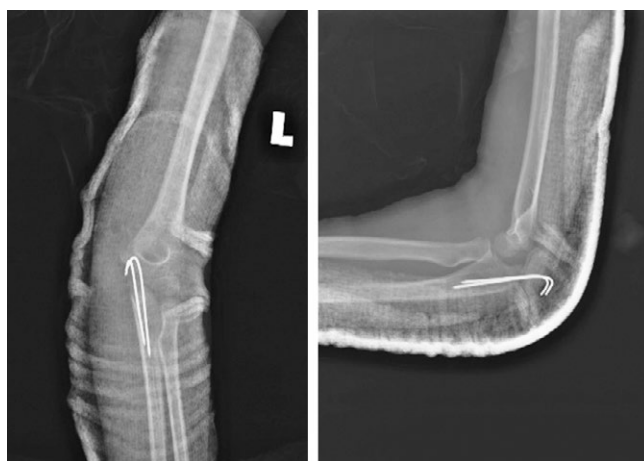
of only <2% [3–6]. Authors report a case of anterior fracture dislocation of the elbow with ulnar nerve palsy in a six-year-old girl.

### Clinical case

A healthy six-year-old girl sustained injury to her left elbow after she tripped and fell in the toilet. She was brought immediately to casualty by her parents. Clinically, her left elbow was swollen and deformed. There was no wound or blister present. Ulnar claw was observed with reduced sensation over ulnar nerve distribution. However, the brachial



**Fig. 1.** Plain radiograph of left elbow showing anterior dislocation of elbow associated with olecranon fracture



**Fig. 2.** Post-operative plain radiograph of left elbow. Dislocation has been reduced and K-wires were used to stabilise olecranon fracture

and distal pulses were present. No other injury was found.

The plain radiographs of her left elbow revealed anterior dislocation of the left elbow with olecranon fracture (Figure 1). Close manual reduction was attempted approximately two hours post trauma at casualty but failed. Open reduction and percutaneous K-wire insertion under general anaesthesia was performed approximately 6 hours post trauma. Medial approach of the elbow was chosen for assess of ulnar nerve exploration and fracture reduction. Intra-operatively ulnar nerve was found impinged by the distal ulnar fragment just distal to the medial condylar groove. It was stretched and appeared slightly pale but was in continuity. Ulnar nerve was mobilised proximally and distally until tension-free. The olecranon was found fractured at its metaphysis with a sleeve of bone attached to its physal-epiphyseal region. It was a Salter-Harris Type II fracture. Gentle controlled traction was applied to the elbow for bony reduction. The fracture was fixed with two parallel K-wires and the radial head was reduced spontaneously. Medial collateral ligament (MCL) was completely

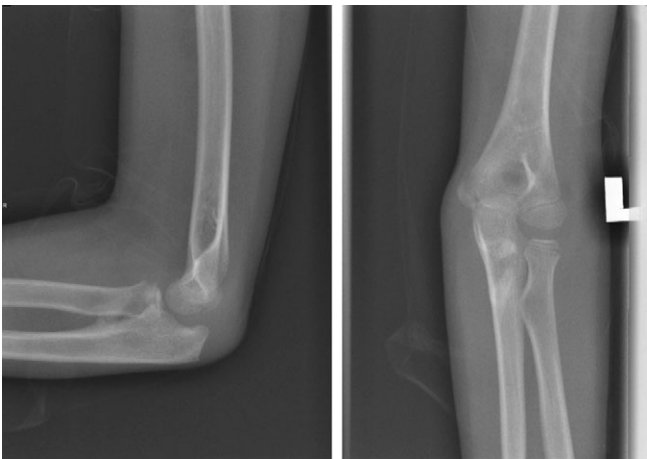


Fig. 3. Fracture united at 6 weeks post-op.

torn and was repaired using 5/0 absorbable suture. Intra-operative stability assessment was done with elbow joint was found stable in supination, pronation, flexion and extension. Brachial, radial and ulnar pulses were good after reduction and repair. The elbow was immobilised at 90° flexion with forearm in supination in a splint (Figure 2).

Clinically numbness of ring and little finger improved at 1-week post-op. Ulnar claw was resolved at 2 weeks. The fracture heals and the

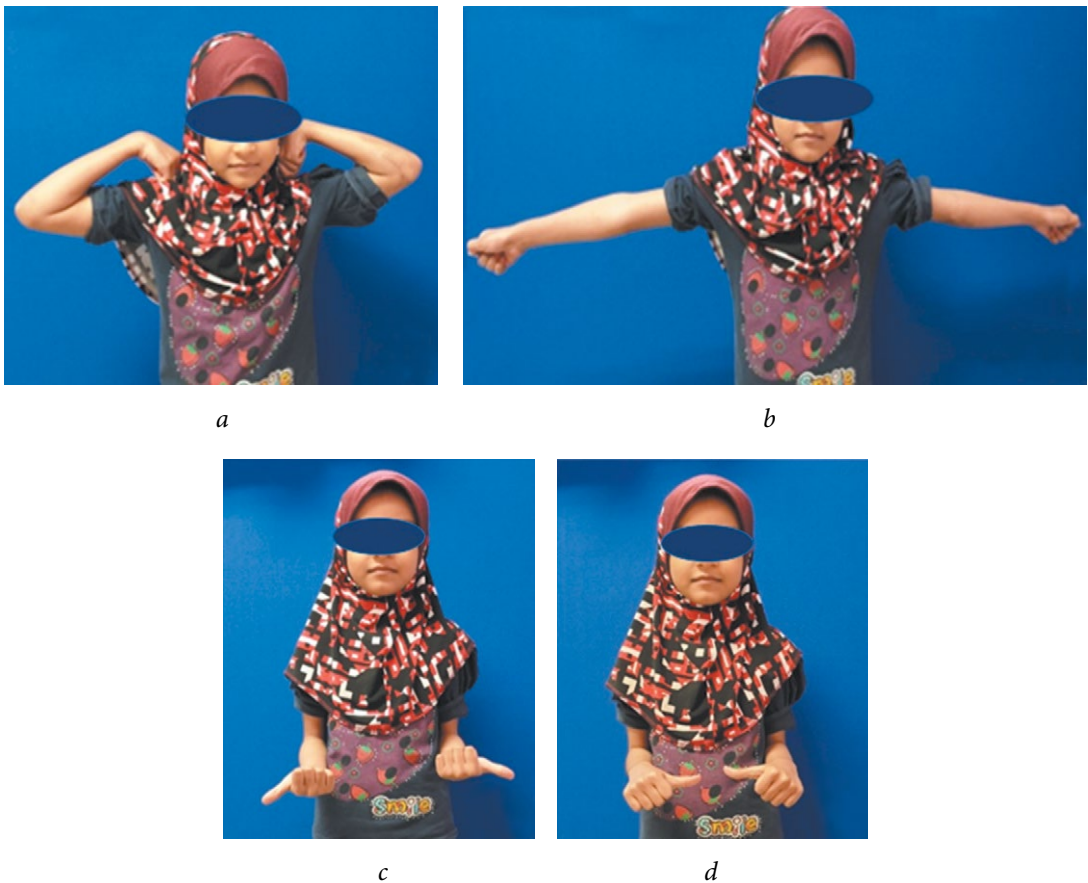


Fig. 4. Range of movement of patient’s left elbow at 8 weeks post-op.: *a* — flexion; *b* — extension; *c* — supination; *d* — pronation

K-wires were removed at 6 weeks (Figure 3). Gentle passive movement of elbow were started at 4 weeks followed by active movement at 6 weeks. Splint was removed at 6 weeks. At 8 weeks, range of movement of the elbow was full. The elbow was stable in varus and valgus stress tests. Patient was able to return to her usual activities. She is currently being follow-up 3 monthly (Figure 4).

## Discussion

Elbow dislocation in paediatric age group is uncommon. The peak incidence of paediatric elbow dislocation is when physis begins to close between 10 to 15 years of age [7]. Anterior elbow dislocation is rare due to strong bony stabilising effect of ulno-humeral joint and soft tissue structure of the posterior column, namely the triceps and posterior capsule [8].

Anterior dislocation may happen in a direct force to the dorsal aspect of forearm with the elbow in semi-flexed position, with avulsion of the tip of olecranon near the insertion of triceps [1, 9, 10]. This was seen in this case during the intra-operative exploration.

It was reported that 75% of paediatric elbow dislocation had an associated elbow injury, with 24% of cases were not diagnosed on initial X-rays [7]. The common associated injuries include medial epicondylar avulsion, olecranon avulsion, coronoid fracture, medial and lateral condylar fracture, radial head and neck fracture. Missed interpretation of plain radiograph might lead to delayed or proper management in these cases. Osteochondral fragments or missed avulsions can lead to improper reduction of joint and recurrent dislocation. Therefore, Magnetic Resonance Imaging (MRI) will be helpful in suspicious or irreducible cases.

Median nerve was reported at greatest risk of injury in elbow dislocation with medial epicondyle fracture, followed by ulnar nerve in similar injury [5]. It was unusual to have ulnar nerve injury in anterior dislocation. Open reduction and ulnar nerve exploration were warranted in this case as closed reduction was unsuccessful and ulnar nerve compressive signs were present. With regards to surgical approach and technique, there was no clear recommendation in the literature. We chose medial approach of the elbow to reduce the dislocation

as well as to explore ulnar nerve. Linscheid and Wheeler [3] suggested ulnar nerve transposition during open reduction but we found that it was unnecessary as the nerve was not severely damaged and it was left tension free in situ.

There were scanty reports on ligamentous instability in paediatric elbow dislocations. The direction of anterior dislocation in this case was anteromedial, which we found the MCL was completely torn. Direct repair was done to restore the medial stability. There was no consensus on the period of immobilisation of the joint post-reduction. There should be a balance in between joint stability and elbow stiffness.

Vascular injury following elbow dislocation has been well-recognised, especially in open injury [11, 12]. Meticulous examination of distal circulation was crucial as intimal injury of vessel wall or thrombosis can present much later.

## Conclusion

Anterior elbow dislocation in paediatric with ulnar nerve palsy is extremely rare. Associated injury of the elbow should not be missed. An early diagnosis, prompt treatment and proper planning of operation could provide good prognosis and prevent complication.

## Additional information

**Source of funding.** The study did not have financial support or sponsorship.

**Conflict of interests.** Authors declare no explicit and potential conflicts of interests associated with the publication of this article.

**Ethical statement.** The patient and parents have provided their informed consent for the publication of this case report.

### Author contributions

*N.A.K. Ashar:* conception of the study, manuscript writing and collection of data.

*S.K. Liew:* conception of the study, manuscript writing and critical revision for important intellectual content. Accountable for all aspects of the manuscript and ensuring the accuracy and integrity of the work.

*N.S. Azmi, R. Lingam, R.A. Chen:* substantial contributions to the conception and manuscript drafting, data collection and analysis.

*R.D.K. Yeak*: critical revision for important intellectual content and analysis.

All authors made a significant contribution to the research and preparation of the article, read and approved the final version before publication.

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