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Case report

Pediatric anterior elbow dislocation due to a rare mechanism of injury: A case report

W.H.D. Dimantha [a,*], Kalaventhan Pathinathan [a], Dishanth Sivakumaran [a], P.M. P. Gunawardena [a], S.R. Madushanger [a], Sunil Wijesinghe [b]

[a] Postgraduate trainee in Orthopaedic Surgery, Sri Lanka
[b] The Lady Ridgeway Specialized Children Hospital, Sri Lanka

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ABSTRACT

Introduction & importance: Elbow dislocations are rare among the pediatric population as their ligaments are stronger than bones. Anterior dislocations of the elbow are even rarer entity usually caused by anteriorly directed force on the hyper-flexed elbow. We present a case of a rotational force on an extended elbow causing anterior dislocation of the shoulder in an 11-year-old boy.

Case presentation: An 11-year-old boy presented to the Accident & Trauma unit with pain & swelling of the right elbow following a twisting injury by a spinning washing machine. The child was in pain.

Clinical discussion: His elbow was semi flexed and deformed. Distal neurovascular status was found normal. Radiographs of the right elbow revealed anteromedial dislocation of the elbow with the medial epicondyle avulsion. Emergent relocation of the elbow joint has been performed. A concentric reduction, absence of incarcerated bony fragments and stability has been confirmed by the fluoroscopic examination. Post reduction neurovascular examinations unremarkable. The child was discharged with the above-elbow splint. The range of motion exercises has been commenced after three weeks. The child achieved full range of motion at six weeks of post-injury.

Conclusion: Anterior dislocations are a rare entity in pediatric orthopaedic practice. Evaluation of the causative mechanism of injury is the clue. A rare type of mechanism of injury also should be kept in mind to prevent the delay in diagnosis and treatment.

1. Introduction

Traumatic elbow dislocations are relatively uncommon injuries in the pediatric population. Stronger ligaments compare to the distal humereus in this population responsible for this pattern of this injury. They represent about 3–6% of all pediatric elbow injuries [1]. These injuries are often seen between 10 and 15 years of age [2]. Posterior dislocation is the most common type of dislocation in literature at roughly 90%. Avulsion fractures of the medial epicondyle are the commonest fracture associated with this condition [3]. We report a rare case of a skeletally immature patient who presented with a traumatic anterior elbow dislocation.

This case is reported according to the SCARE guideline 2020 [4].

2. Case report

An 11-year-old otherwise healthy boy presented to the emergency department with a right elbow deformity following an injury sustained after putting his hand to a spinning washing machine. Examination revealed a swelling in the right elbow with a normal upper limb neurovascular examination. X-ray evaluation revealed an anteromedial elbow dislocation with an avulsion fracture of the medial epicondyle (Fig. 1).

In the operating room, under general anaesthesia, closed reduction was performed with postero-lateral force applied on the proximal forearm while holding the humerus by an orthopaedic registrar. The joint reduction was achieved in one attempt even though the open reduction was anticipated due to the degree of displacement. The reduction was confirmed fluoroscopically and no intraarticular incarcerated fragments were noted. Joint stability was checked and an above elbow POP back

* Corresponding author.
E-mail addresses: ddimantha@gmail.com (W.H.D. Dimantha), m29085@pgim.cmb.ac.lk (K. Pathinathan).

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slab was applied in elbow flexion at 90° (Fig. 2).

The patient was splinted for three weeks and gradual active and passive movements were initiated to allow the medial epicondyle avulsion to heal. At one month following the reduction, the elbow joint was stable with no subluxation. He achieved full flexion, pronation and supination. But the extension was limited to 120 degrees. Physiotherapy was given for additional two weeks and finally patient gained full extension (Figs. 3 and 4).

3. Discussion

Pediatric elbow dislocations are less common than fractures or epiphyseal injuries around the elbow joint [5]. Elbow dislocations are often seen during 10–15 years of age. This higher incidence can be explained by partial closure of the physis around the elbow [6]. Similar to adult elbow dislocation posterior dislocations are common among pediatric elbow dislocations. These occur usually due to falling on an outstretched hand with the overall forces creating the dislocation include axial compression, valgus stress and supination [7]. The mechanism for anterior dislocation usually involves a fall on the flexed elbow, with an anteriorly directed force on the proximal ulna [8]. However, in our patient, the probable mechanism was a torsional force with hyperextension of the elbow joint.

The initial evaluation begins with a short history to identify the mechanism of injury followed by visual inspection for deformity and malposition of the upper limb. The soft tissue status should be inspected including skin ecchymosis. The elbow should be palpated for tenderness and the wrist must be examined for distal radio-ulnar joint instability which would indicate disruption of the interosseous membrane [9]. The neurovascular status should be assessed and documented.

The initial management should be urgent closed reduction which will help decrease pain, swelling and taking off the pressure on neurovascular structures. Reduction is usually done under intravenous sedation or general anaesthesia with muscle relaxation. For anterior elbow dislocation, the reduction is done by flexion of the elbow while applying downward pull on the proximal forearm with correction of sagittal plane displacement [10]. Stability should be checked throughout the range of motion. Post reduction neurovascular status should be assessed and documented. A long arm posterior splinting with elbow flexion should be kept for five to ten days [11].

Medial epicondyle fractures are commonly associated with pediatric elbow dislocation. Up to 60% of medial epicondyle fractures are associated with elbow dislocations in children. The incarcerated intra-articular bone fragment may block the reduction. Ulnar nerve neuropraxia is the most common injury due to nerve stretching during dislocation followed by median nerve neuropraxia. These are managed initially by observation and typically resolve with time. However, nerve entrapment can occur if fractures are present which warrants exploration of the nerve [12].

The commonest complication associated with anterior elbow dislocation is varying. In the acute situation, it is associated with vascular injury and compartment syndrome. Stiffness, reduced range of motion especially in terminal extension, heterotrophic ossification and contracture. This occurs commonly with prolonged immobilization usually more than three weeks and can be improved with gradual physical therapy.

4. Conclusion and learning points

Anterior elbow dislocation is an orthopaedic emergency. It can be seen in the pediatric population rarely. Awareness about the condition and a high degree of suspicion is necessary when evaluating patients with unusual modes of injury.

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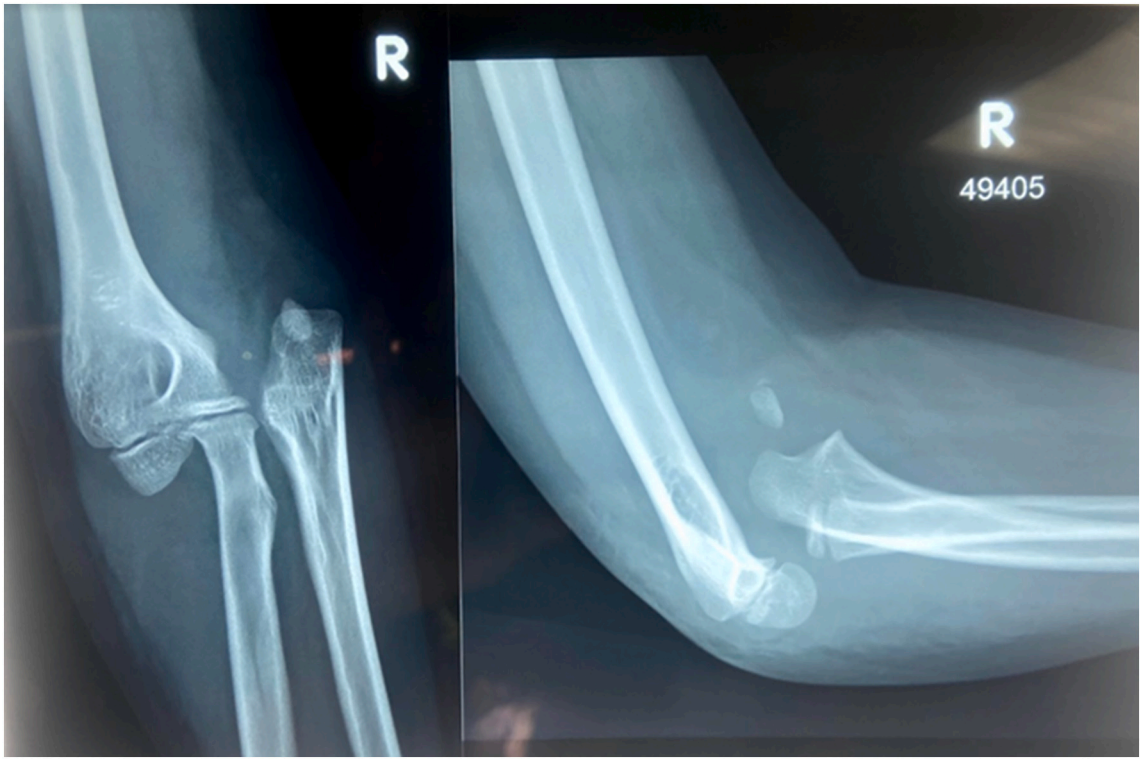

Fig. 1. AP and Lateral radiographs of right elbow joint showing anteromedial elbow dislocation with a medial epicondyle avulsion fracture.

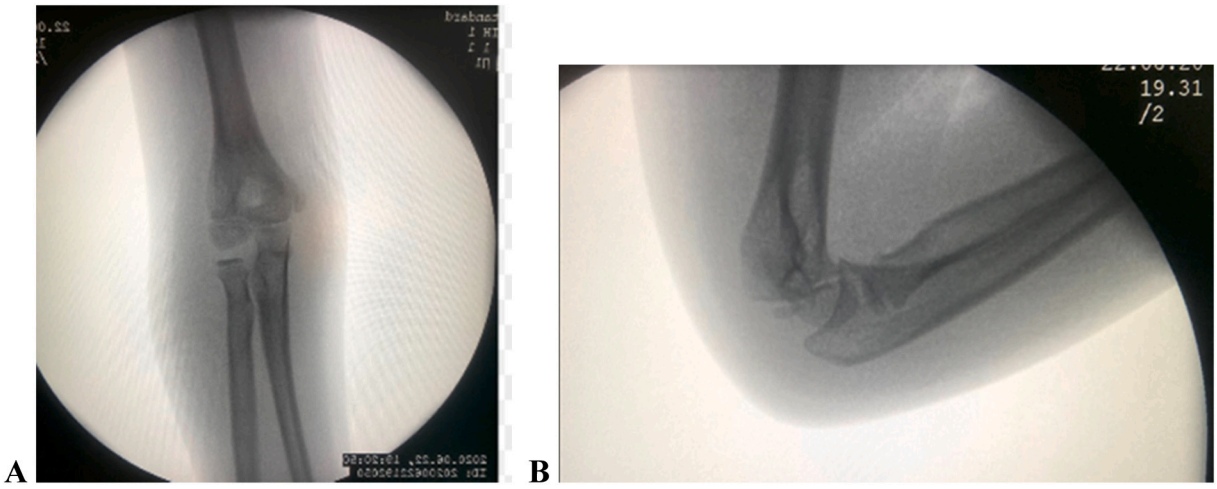

Fig. 2. Intraoperative fluoroscopy images (anteroposterior 2A & Lateral 2B) confirmed the concentric reduction of the elbow joint and the medial epicondyle.

Fig. 3. Shows various movements at four weeks have been shown in the above images. Note that, the extension lag at four weeks which has been improved in six weeks.

Ethical approval

Not applicable.

Consent

Informed written consent has been obtained from the parents of this patient for the case report and the accompanying images. A copy of written consent is available for review on the request by the Editor-In-Chief of this journal.

Authors' contribution

All authors of this case report have contributed to the patient management, data collection, concept and writing of this case report.

Registration of research study

Not applicable.

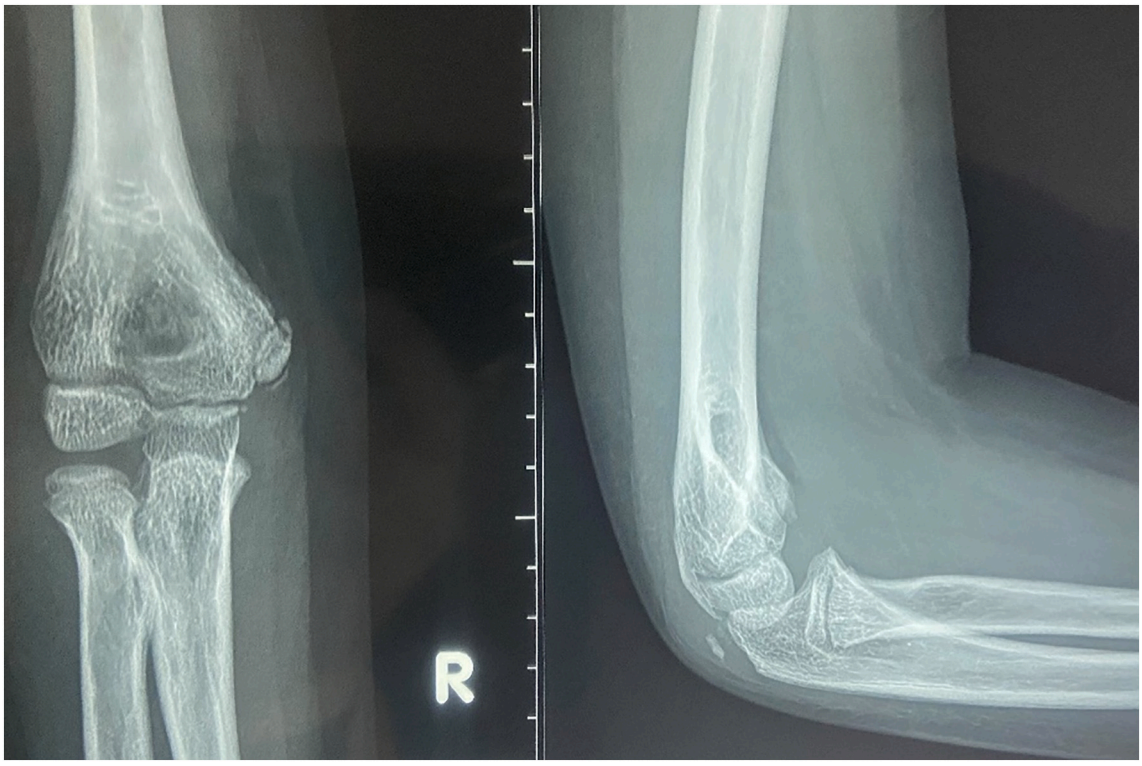

Fig. 4. Shows anteroposterior and lateral views of radiographs show healed medial epicondylar avulsion.

Guarantor

Dr. Sunil Wijesinghe, Senior consultant Orthopaedic surgeon, Department of Trauma & Orthopaedics, The Lady ridgeway children specialized hospital, Sri Lanka.

Provenance and peer review

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Declaration of competing interest

All authors of this case report disclose any financial or personal involvement of third parties or any organizations that could inappropriately influence their work.

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