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Case Report

Missed post-traumatic radial head dislocation in a three-year-old child: A case report

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الملخص

الخلع الرضحي لرأس عظمة الكعبرة لدى الأطفال غالبا يصاحبه كسر أو تشوه في عظمة الزند، وهذا ما يسمى بإصابة مونتيجيا أو متشابهات مونتيجيا. إن خلع رأس عظمة الكعبرة الرضحي المنفرد نادر الحدوث ويعتبر استثنائيا. وغالبا لا يتم التشخيص في التصوير الشعاعي الأولي، خاصة لو كان منفردا. ويمثل علاج الخلع الرضحي لرأس عظمة الكعبرة فائت التشخيص تحديا كبيرا ويبقى مثيرا للخلاف والجدل.

في هذا التقرير نقدم حالة خلع مزمن تال للرضح لرأس عظمة الكعبرة وذلك لدى طفل عمره ثلاث سنوات، وتم علاجه عن طريق رد مفتوح للخلع مع إعادة تشكيل الرباط الحلقي. وفي آخر زيارة متابعة للطفل، كان المرفق المصاب في حالة ثبات ولم يكن هناك تورم أو تشوه وكانت وظيفة المرفق طبيعية.

إن الإصابة في هذه الحالة لا تنتمي إلى أي من أنواع إصابة مونتيجيا أو متشابهات مونتيجيا، وهذا ربما يفسر التأخر في التشخيص. بناء على هذا التقرير يوصي المؤلفون بسرعة رد هذا الخلع فور تشخيصه والقيام بإعادة تشكيل الرباط الحلقي وبالأخص في حالة عدم ثبات المرفق.

الكلمات المفتاحية: رأس الكعبرة؛ غير مُشخص؛ خلع؛ مونتيجيا؛ الرباط الحلقي

Abstract

In children, traumatic radial head dislocation (RHD) is usually associated with ulnar fracture or deformation as reported in a Monteggia injury or its Monteggia variant. Isolated traumatic RHD is extremely rare and exceptional. Traumatic RHD is frequently missed on initial radiographs, particularly if it is isolated. The management of missed RHD is challenging and remains controversial. We report a Case of chronic post-traumatic RHD in a three-year-old child treated with open reduction and reconstruction of the annular ligament. The child's elbow was stable during the follow-up, without swelling or deformity, and the elbow function was normal. The injury of the reported case does not belong to any lesion described in the Monteggia-variant classification, which might explain the reason for missing the associated dislocation. The authors recommend urgent open reduction when a chronic RHD is diagnosed and annular ligament reconstruction, particularly when the open reduction is unstable.

Keywords: Annular ligament; Dislocation; Missed; Monteggia; Radial head

Introduction

Radial head dislocation (RHD) rarely happens in children younger than eight years old.[1] Isolated traumatic RHD is extremely rare and exceptional. In children, isolated nontraumatic RHD is frequently described as a solely congenital anomaly or a part of another congenital disorder.[2–4] Traumatic RHD is frequently missed on initial plain radiographs, particularly if it is isolated.[2] A missed traumatic RHD is defined as one diagnosed four weeks after the initial injury and is usually termed as chronic RHD.[5] Although most children with missed dislocations

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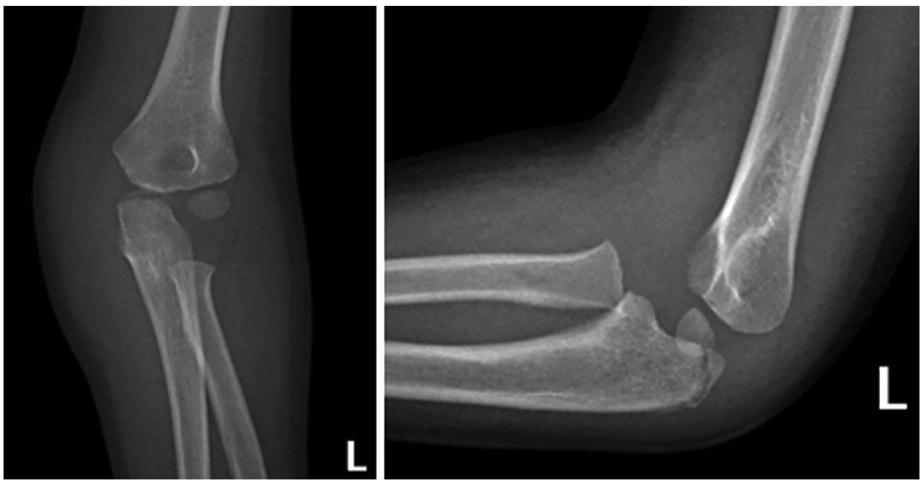

Figure 1: AP and lateral radiographs, left elbow at first presentation.

are initially asymptomatic, they may develop pain, motion limitation, and secondary degenerative changes that eventually necessitate treatment.[6,7] Open reduction of missed RHD is necessary to restore satisfactory functional results. Nevertheless, many complications have been reported after surgical treatment.[3,8] Some authors have recommended leaving the dislocation and removing the radial head at skeletal maturity.[6,9] Logically, stable open reduction will require annular ligament reconstruction to avoid recurrent dislocation. However, the reconstruction is not without complications, contraindicating its routine use in every Case.[2,5]

Here, we are reporting a Case of chronic post-traumatic RHD in a three-year-old child treated with open reduction and reconstruction of the annular ligament. The report highlights the importance of early diagnosis of RHD and discusses the risk factors associated with missing this injury. Management of chronic RHD is also evaluated, emphasising the usefulness of annular ligament reconstruction.

Case report

We present the Case of a three-year-old boy brought to our emergency room by his mother 2 h after he fell on his left outstretched hand. The child was unwilling to move his left upper limb. He had a painful and moderately swollen left elbow with intact neurovascular bundles. An orthopaedic resident viewed the initial left elbow radiograph (Figure 1) and diagnosed a fractured left olecranon tip. The fracture was stabilised with a back-slab, and the child was sent home with instructions to return to the fracture clinic after four days. During that visit, the x-ray was repeated, but the diagnosis remained unchanged, and the child was given another follow-up appointment. After four weeks, the slab was removed. The swelling had subsided, but there was restricted elbow motion, particularly during pronation and supination. The patient was sent for physiotherapy and given a six-week follow-up appointment. Ten weeks after the initial trauma, the patient was reassessed because of persistent

Figure 2: AP and lateral radiographs, left elbow 10 weeks after the initial trauma.

Figure 3: Follow up AP and lateral radiographs, left elbow two years after surgery.

limited elbow motion, and a new radiograph was done (Figure 2). The diagnosis was confirmed as a missed RHD associated with a fractured olecranon tip. The patient was immediately admitted for an open reduction of the RHD with a possible ulnar osteotomy and/or annular ligament reconstruction. The procedure and its possible complications were discussed with the parents, and they agreed to the planned surgery.

The surgeon performed the open reduction through a posterior approach. The remnants of the annular ligament were excised so the radial head could be reduced easily, but the reduction was unstable. An annular ligament reconstruction was performed using a lateral triceps tendon strip to stabilise the reduction without the need for a K-wire fixation. Intra-operative radiographs showed an excellent position of the radial head. The wound was closed in layers after the tourniquet was released and haemostasis performed. A back-slab was applied, and the child went home the next day. The wound healed readily. The cast was removed after six weeks, and physical therapy commenced in the form of gentle, assisted, active mobilisation of the elbow and forearm. At the last follow-up two years after surgery, the left elbow was stable with no swelling, no deformity, and no tenderness. The elbow had normal function and a normal radiograph (Figure 3). The elbow extension was full; however, its flexion was five degrees less than the full range. There were 15 degrees of active motion for both supination and pronation. Passive supination could reach 40°, and passive pronation could reach 30°. The child had no complaints and could perform normal daily activities. Generally, his parents were happy and satisfied about the final result.

Discussion

In children, traumatic RHD rarely exists as an isolated injury. It is usually associated with a fracture or plastic deformation of the ulna and presents as a Monteggia or Monteggia-variant lesion.[1,3] The diagnosis of traumatic RHD in children, particularly if it is an isolated lesion, can be easily missed due to the paucity of knowledge about this condition.[4] Plain x-rays of the whole forearm and the other elbow help establish an accurate diagnosis and could help exclude a Monteggia injury or congenital dislocation.[3,10] The RHD in the present Case was associated with a fractured olecranon tip with no ulnar shaft fracture or deformation. A fractured olecranon tip was never described formerly as part of the Monteggia or Monteggia-variant lesions. Also, the mechanism of injury responsible for an RHD could not be the cause of this associated fracture. Therefore, the reported case could be considered a missed isolated traumatic RHD associated with a distinct fractured olecranon tip. This combination has not been described before, which might be why the dislocation was missed in the present case. The associated fracture attracted the attention of the emergency physician, who overlooked the rare injury of the RHD.

Treating missed or chronic dislocations carries many challenges. The chances of obtaining a closed reduction four weeks after the initial trauma are negligible; open reduction is usually required to restore normal anatomy.[5] We agree with Gupta et al.[2] that leaving a chronic radial head dislocation untreated could result in stiffness, instability, and loss of function. Therefore, open reduction should be accomplished straightaway. Repeated attempts at closed reduction should be avoided to preclude the occurrence of chondral or neural damage.

Adequate ulnar correction and fixation are critical for reducing the radial head in Monteggia and Monteggia-variant injuries. A trans-articular K-wire fixation might be needed to achieve stability after the reduction with or without annular ligament reconstruction.[7,8,10] Neither situation occurred in the reported Case, which was not a Monteggia or Monteggia-variant fracture. Hence, there was no need for an ulnar osteotomy or lengthening. Also, the radial head was stable after the open reduction and reconstruction of the annular ligament, so no additional stabilisation was necessary.

A complete RHD cannot occur without a rupture of the entire annular ligament, which is the principal stabilising element of the proximal radioulnar joint.[3] This was recognised clearly in our Case during surgery. The role of

reconstructing the annular ligament to maintain the reduction has never been appropriately investigated. Some authors have encouraged its use in all cases that require open reduction.[4,5] Reconstruction involves harvesting a slip from the triceps aponeurosis or the deep fascia of the forearm and fashioning a loop around the radial neck. Boyd et al.[11] used a slip from the extensor aponeurosis, Bell-Tawse[12] used a central slip of the triceps aponeurosis, and Lloyd-Roberts et al.[13] used a lateral slip with its distal attachment. The technique used in the present case was that described by Lloyd-Roberts. Ayuba et al.[3] performed an annular ligament repair followed by a K-wire to fix the proximal radioulnar joint, but they mentioned that the K-wire fixation seemed unnecessary. We agree with Neves et al.[6] that performing good and meticulous annular ligament reconstruction can obviate the need for trans-articular wires, which can introduce such complications as infection, migration, or breakage. The authors recommend exploring all possible avenues to avoid trans-articular K-wire fixation.

The time between the injury and initial treatment and the patient's age might affect the surgical outcome of chronic RHD. The critical question is when the surgical reduction should be performed to be optimally beneficial. Delays in surgical repairing chronic dislocations could increase the need for more extensive surgical procedures later and preclude favourable outcomes due to the secondary adaptive and dysplastic changes that could affect the radial head and capitellum if the injury remains untreated.[6,9] Based on our experience, including the present Case, we recommend urgent open reduction as soon as chronic RHD is recognized.

In conclusion, physicians dealing with emergency cases should be taught to recognise rare injuries to avoid the adverse effects of missing a fracture or dislocation. Physicians should ensure that a fracture identified in the initial x-rays was not accompanied by one of the many possible associated injuries. Although isolated RHD is a rare condition, it does occur and must be dealt with as soon as possible. Surgical reduction of chronic RHD could have a favourable outcome through meticulous open reduction and annular ligament reconstruction as needed.

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Conflict of interest

The authors have no conflicts of interest to declare.

Ethical approval

This study was approved by the King Saud University IRB on 15 June 2021(Ref. No. 21/0492/IRB).

Authors contributions

MMZ and KB declare that both authors made substantial contributions to all the following: conception and design of the study; collection of data; drafting the report or revising it critically for important intellectual content; and final approval of the version to be submitted. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

References

1. Tarallo L, Novi M, Porcellini G, Catani F. Isolate and irreducible radial head dislocation in children: a rare Case of capsular interposition. **BMC Musculoskelet Disord 2020 Oct 7**; 21(1): 659.
2. Gupta V, Kundu Z, Sangwan S, Lamba D. Isolated post-traumatic radial head dislocation, a rare and easily missed injury-a Case report. **Malays Orthop J 2013 Mar**; 7(1): 74–78.
3. Ayouba G, Walla A, Bakriga B. Traumatic isolated radial head dislocation in children: a Case report. **Open J Orthoped 2016 November 23**; 6: 344–349.
4. Bhardwaj A, Sharma G. Isolated traumatic chronic anterior dislocation of radial head. **J Clin Diagn Res 2018 Jul**; 12(7): 4–5.
5. Bhaskar A. Missed Monteggia fracture in children: is annular ligament reconstruction always required? **Indian J Orthop 2009 Oct**; 43(4): 389–395.
6. Neves N, Pinto R, Tulha J, Ribeiro da Silva M, Matos R, Trigo-Cabral A. Chronic post-traumatic lateral dislocation of the radial head. **Orthop Traumatol Surg Res 2010 Apr**; 96(2): 199–202.
7. Langenberg LC, Beumer A, The B, Koenraadt K, Eygendaal D. Surgical treatment of chronic anterior radial head dislocations in missed Monteggia lesions in children: a rationale for treatment and pearls and pitfalls of surgery. **Shoulder Elbow 2020 Dec**; 12(6): 422–431.
8. Lädermann A, Ceroni D, Lefèvre Y, De Rosa V, De Coulon G, Kaelin A. Surgical treatment of missed Monteggia lesions in children. **J Child Orthop 2007 Oct**; 1(4): 237–242.
9. Belangero WD, Livani B, Zogaib RK. Treatment of chronic radial head dislocations in children. **Int Orthop 2007 Apr**; 31(2): 151–154.
10. El-Sobky T, Samir S, Aly A. Neglected anterior Monteggia lesion with a displaced intra-articular medial condyle fracture in a child: a rare and challenging association. **J Musculoskelet Surg Res 2017 October-December**; 1(2): 49–52.
11. Speed JS, Boyd HB. Treatment of fractures of ulna with dislocation of head of radius (Monteggia fracture). **J Am Med Assoc 1940 November**; 115(20): 1699–1705.
12. Bell Tawse AJ. The treatment of malunited anterior Monteggia fractures in children. **J Bone Joint Surg Br 1965 Nov**; 47(4): 718–723.
13. Lloyd-Roberts GC, Bucknill TM. Anterior dislocation of the radial head in children: aetiology, natural history and management. **J Bone Joint Surg Br 1977 Nov**; 59-B(4): 402–407.

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